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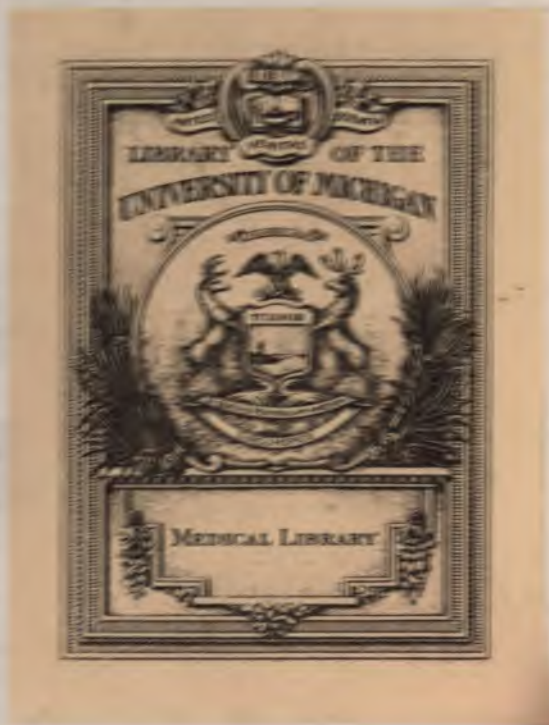
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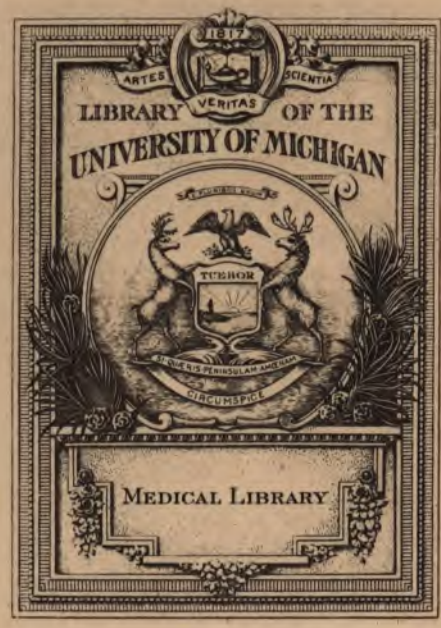
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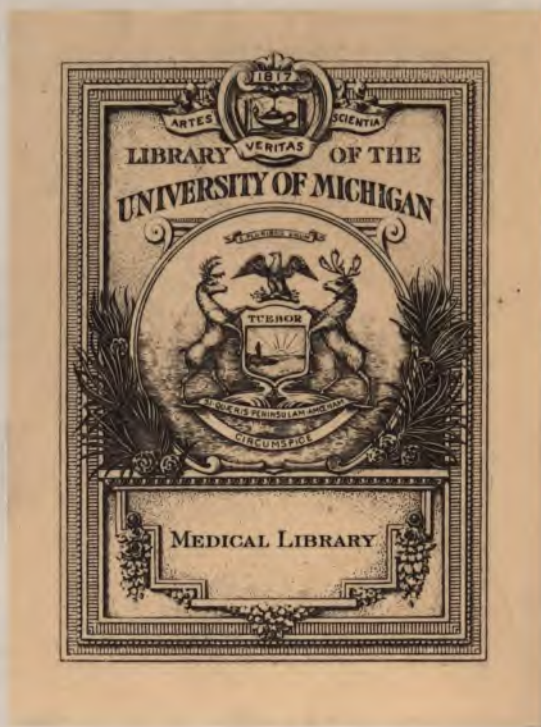
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1887.

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TRANSACTIONS

OF THE

MINNESOTA

State Medical Society

1887.

ST. PAUL:
H. M. SMYTH PRINTING CO.
1887.

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CENSORS:

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A. W. STINCHFIELD, M. D.

For One Year— A. H. LINDLEY, M. D.
W. W. MAYO, M. D.

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PROCEEDINGS

OF THE

NINETEENTH ANNUAL MEETING

OF THE

Minnesota State Medical Society

The Society met at 10 A. M., Thursday, June 16th, 1887, in the Grand Opera House at Duluth. The President being unavoidably absent, the First Vice-President, Dr. Beebe, occupied the chair.

An eloquent address of welcome was made by Prof. W. H. Phelps.

Drs. W. W. Mayo, Millard and A. W. Abbott were appointed the committee on new members.

The committee on nominations of chairmen of sections was appointed as follows: Drs. Park Ritchie, Hand, Hunter, A. J. Murdock, McDavitt, Flinn, Wallbank, Rosser, C. E. Rogers, Blackmer, and Maloy.

Dr. S. C. McCormick, Chairman of the Executive Committee, presented to the Society the programme for the work of sections. On behalf of the citizens of Duluth, he invited the members to attend a reception at the Hotel St. Louis in the evening. He also announced an excursion on Lake Superior for Friday afternoon.

The amendment to the By-Laws proposed by Dr. Millard at the last annual meeting [see pages 5 and 6, TRANSACTIONS 1886,] was now brought before the Society, and was unanimously adopted, without discussion.

The following telegram from the President to the Society was read by the Secretary:

"Hope your session will be harmonious, beneficial and pleasant. God speed. H. H. KIMBALL."

By vote of the Society, the Secretary then read the President's Address.

The general session then adjourned till Friday morning, June 17th. The afternoon was occupied with the work of sections.

FRIDAY MORNING.

The session of Friday morning opened at 10 A. M., with prayer by the Rev. E. M. Noyes of Duluth.

The committee on new members reported, and the gentlemen recommended were elected members of the Society. [Their names will be found in italics in the roster at the back of this volume.]

The committee on nomination of chairmen reported the following names, and their nominations were confirmed by vote of the Society.

Practice of Medicine—C. H. Hunter, Minneapolis.
Surgery—A. C. Wedge, Albert Lea.
Obstetrics—S. C. McCormick, Duluth.
Gynæcology—F. A. Dunsmoor, Minneapolis.
Epidemics, Climatology and State Medicine—W. L. Beebe, St. Cloud.
Diseases of Children—Thomas McDavitt, Winona.
Nervous Diseases—J. E. Bowers, Rochester.
Materia Medica—W. N. Stratton, Granite Falls.
Ophthalmology and Otology—J. H. Stewart, St. Paul.
Medical Education—R. O. Beard, Minneapolis.

Medical Jurisprudence.—E. C. Collins, Duluth.
Orthopædic Surgery—R. L. Moore, Spring Valley.
Pathology—A. Shimonek, St. Paul.

Dr. Wheaton proposed Dr. F. W. Epley of New Richmond, Wis., as an honorary member of the Society. Dr. Epley was elected unanimously.

The Society then proceeded to the election of officers for the ensuing year. The result is shown on page 2 of this volume.

Dr. Beard introduced a resolution directing that the Transactions be printed in installments in the NORTHWESTERN LANCET. It was explained by the editors of the LANCET that this could be done at less expense to the Society than by the present method. Drs. Hunter, Ritchie of Duluth, and others, spoke in favor of the resolution. Drs. Phillips, S. B. Sheardown and others, opposed. Finally, on motion of Dr. Sheardown, the resolution was tabled by a vote of 23 to 14.

Dr. Abbott, of Minneapolis, introduced the following as an amendment to Sec. 4, Art. XI., of the By-Laws:

That the Committee on Publication shall, in addition to the duties prescribed by the Constitution, select from the papers presented to the Society, such papers as have sufficient scientific and literary interest to warrant their publication, and that only such papers shall be printed in the Transactions.

Dr. Abbott's resolution was unanimously adopted.

Dr. Stone, of St. Paul, introduced the following:

Resolved, That a permanent fund of twenty-five dollars be set aside each year and applied to a prize to be offered annually for the best paper upon any medical or surgical subject. That all such papers be submitted to a special committee of three to be appointed by the President, at least three weeks before the annual meeting each year.

Dr. Stone's resolution was unanimously adopted.

It was moved by Dr. W. J. Mayo, and carried unanimously, that the Society contribute $100 to the expenses of the International Medical Congress.

On motion of Dr. S. B. Sheardown, the thanks of the Society were unanimously voted to the profession and citizens of Duluth for the cordial hospitality extended to the Society.

On motion of Dr. McDavitt, Dr. Beard was now invited to read a paper prepared for the section on Medical Education.

After the reading of Dr. Beard's paper, the general session adjourned.

Treasurer's Report.

S. B. SHEARDOWN,

In Acct. with the Minn. State Medical Society.

		DR.
To balance on hand from 1886, - -		$778 11
Amt. received for initiations and certificates,		195 00
" " " annual dues 1886, -		416 00
" " " delinquent dues, -		142 00
	CR.	
By paid H. M. Smyth Ptg. Co.,	$235 00	
" C. B. Witherle (salary),	100 00	
" " " postage and stationery, - -	24 00	
" R. S. McMurdy (expenses),	15 17	
" Jones & Kroeger, - -	3 00	
" Janitor, - -	5 00	
" Treasurer's expenses, -	25 00	
" Balance on hand, -	1123 94	
	$1531 11	$1531 11

Duluth, June 17th, 1887.

S. B. SHEARDOWN, Treasurer.

The following appointments have been made by the President since the meeting of the Society:

Executive Committee.

A. E. Senkler, Chairman.

C. E. Bean, Park Ritchie.

Committee on Finance.

C. H. Hunter, Chairman.

G. W. Wood, T. S. McDavitt,
G. F. Merritt, J. H. Dorsey.

Committee on Necrology.

W. W. Mayo, Chairman.

A. C. Wedge, M. E. Woodling,
Franklin Staples, C. R. J. Kellum.

Committee on Publication.

C. H. Boardman, Chairman.

E. J. Abbott, E. C. Spencer,
S. B. Sheardown, C. B. Witherle.

Essayist—Talbot Jones.
Alternate—T. C. Clark.

Committee on Adjudging Prize.

A. W. Abbott, Chairman.

E. J. Davis, C. A. Wheaton.

PRESIDENT'S ADDRESS.

Gentlemen and Members of the Minnesota State Medical Society:

At your last annual meeting you did me the honor of electing me your presiding officer. This, in connection with the custom and by-laws governing your conventions, gives me the opportunity of delivering this address, in which I wish to express to you my gratitude, and of assuring you that I feel a deep interest in each and every object for which this Society was organized.

It is with extreme pleasure that I look back to the time when a few gathered together in the City of St. Paul as charter members, and formed the Minnesota State Medical Society. Scarcely more than a dozen were present. It was then considered early days in this western country for medical organizations. Several of the original members, as well as some of more recent connection with the Society, have paid the inexorable demand of nature, and in our deliberations of later years, their voices are not heard imparting practical wisdom and wise counsel to the remaining ones.

Let us who yet live know that the formation of this Society has done more to elevate and dignify the medical profession of this State than all other means combined, and as we love and honor our profession, so we will love, honor and cherish the memory of those who organized and kept this Society alive during the years of its infancy. We may well congratulate ourselves when we know that by the spirit of kindly feeling, and cordial sympathy of

the members at the several meetings of the Society, it has become one of the largest, most influential and intelligent of any in the Northwest.

If we continue as a Society to observe the old maxim "in union there is strength," we shall continue to grow and improve, and our influence will not only be felt over the broad prairies of the West, but we shall be recognized in other lands, and other countries. So then, let us henceforth remain faithful to each other, and loyal to our high vocation, that its dignity may be maintained and its usefulness extended. This being observed will crown our efforts with honor to ourselves and benefit to our profession. When the time shall have arrived that every member of this Society shall fully determine in his own mind to do all in his power to elevate the standard of medical education, to improve the morals of the profession, and by unswerving integrity remain not only true to each other, but to the members of society in general, then we may expect a more devoted protection and hearty co-operation in our time-honored profession.

One of the chief objects of societies like this should be to cultivate kind relations with the outside world, and by so doing a more ready discrimination will be made between the highly cultured and liberally educated physician, and the foul, disturbing excrescences that now pervade the land, having in many large cities and towns a strong foothold. At this time we are cursed to an unusual degree with every form of quackery and humbuggery. We find it reaching out its arms in every avenue, it rolls from every press, it sweeps through every mail, and is emblazoned on every tree and fence-board throughout the country. We grimly stand on our professional dignity, and let ignorance and assumption run riot over us. We must stand with mute lips and folded hands, and have the principles we practice defamed. Whenever the communities in which we live as practitioners of medicine can be con-

vinced that our profession requires a liberal education, constant application, and untiring efforts, then we shall have an easier ascension to the summit of our noble calling.

I think it is generally admitted that we as medical gentlemen have a right to expect certain considerations from the public, a kind of recognition hardly due other educated professions, as our lives are full of sacrifices and hardships. Now then, is it not our duty to return all the protection and services we can? In order to do this, we should keep the standard of medical education high, ourselves well prepared, and live lives of sobriety and honesty; and more than this, we should prevent the too free establishment of medical colleges wherein the degrees to our profession are gained too easily and too cheaply. It is said "whenever goods are cheap there are many buyers." No doubt a majority of the medical gentlemen who have been instrumental in the organization of the several medical schools now well under way, in our western cities, have acted in good faith and are sincere, well cultered and honest men, but there are reasons to believe that quite a large per cent. of the so-called professors of these schools, who have insinuated themselves as teachers, do not well represent the profession, and have taken this course to advertise and for self aggrandizement. And if the medical colleges are too common, our ranks will be filled by unworthy and superficial practitioners, who will compel competition with the more deserving.

Let us move steadily on, deeply impressed with the importance of investigating the hidden truths of the science, applying the good results to the benefit of mankind, keeping constantly in view the many responsibilities resting upon us as physicians, never forgetting that by reason of our professional position it is largely in our power to give tone and impress of such a character to society, as not only to prevent disease and elevate our race,

but inure to the advancement of the profession we represent. Let us acquire knowledge based upon the immutable laws of nature, actively working in the wide field of science, and our influence will be felt beyond the limits of the sick room, reacting favorably upon fame and fortune, diffusing its grateful and humanizing effects through all the social and civil relations of life.

It would be a pleasing task to speak of the many improvements in medicine during the years since we formed as a society, but it would consume much time, and be nothing new to you. The changes have been such and so important that even the non-professional have commented upon the fact, and I will suggest that we continue to investigate and contribute all in our power (be it ever so humble) to assist in adding something to the general fund of information already accumulated. In order that this very desirable object may be attained I would suggest that you never allow any other than medical subjects and the interests of our profession to come before the association for discussion.

And now, my fellow members, in conclusion let me say, the profession we represent is as ancient as time, dating at least as far back as the time when man lost his primal perfection, and pain and suffering came into the world. It was regarded by the remotest nations as sacred, and worthy of the greatest respect and admiration. It was recognized and dispensed with a prodigal hand by the founder of Christianity, which should forever hallow and dignify it. Let us exert ourselves to maintain our ancient and modern position, and acquire wisdom and character, which are the essence of true education, and the light which will enable us to add new merit and perpetuate its reputation until its great learning and many virtues shall rise like the god of day, and shine more and more unto meridian splendor.

PRACTICE OF MEDICINE.

J. C. ROSSER, M. D., CHAIRMAN.

CHAIRMAN'S ADDRESS.

If I read the history of medicine right it is growing more and more complex, and growing away from simplicity and towards many branched development. Pathology and therapeutics are being wedded with an embrace yet closer than hitherto acknowledged, and rational or scientific medicine is becoming still more profoundly scientific. Rendered possible by the advances recently made in pathology, new and distinct branches of special practice have been established—different methods of treatment have been introduced: while the promises offered in the direction of prophylaxis, is to the sanitarian the revelation of a new gospel—practically protesting against the profligacy of the age. Tested by observation and experiment, the specific and infectious nature of a large class of disorders—which were formerly supposed to occupy an entirely different position in their relation to the patient affected and his surroundings, considered almost without exception to depend upon some constitutional taint or predisposition of unknown character, as though the sins of the father had been visited even unto the third or fourth generations—are now "reasonably suspected of hiding the secret of their orgin in a specific germ."

So complete is the logical basis for the belief to which I just referred, that the profession is beginning to

draw the lines that will define more closely the aims of therapeutic effort with reference to many bacillary diseases, and do not hesitate to denounce as illogical the notion of subjecting our patients to a long and more or less useless medication, but place them in the hands of the modern surgeon, who may now conscientiously enter upon surgical undertakings—"paths which the angelic prudence of his predecessors made them fear to tread."

But in acknowledging the importance of the bacterial element as an etiological factor, we must confess that the possibilities of the art of healing are still hampered and restrained by the absence of any adequate system of general treatment that will solve or even approach the pathological conditions universally recognized as existing in that group of maladies known as germ diseases. Yet the art of medicine is becoming more scientific, and its empirical efforts are being established upon a surer basis of reason, as our remedial measures are intended to operate more definitely upon the determining cause of disease. Thus we scrutinize microscopically and chemically every secretion of the human body; we make cultures, and study the natural history of the disease-producing organism in order to arrive at a correct diagnosis, all of which only furnishes the terms of the problems that we have yet to solve before we may reasonably hope to become masters of our position.

In pursuing such inquiries, it is interesting to notice the changes which are taking place as the etiology of disease becomes more and more manifest. The therapeutical problems which had been previously approached from above, are now attacked from below—while theoretic effort is passing from the super- to the sub-sensible; and to treat disease rationally we are dismissing polypharmacy and other random shots at imaginary foes, and employing single remedies, which is the test of a surer aim with a more intelligent purpose.

THE AMMONIA TREATMENT OF TYPHOID FEVER.

At our last session I called attention to this method of treating typhoid fever, and endeavored to point out the most prominent pathological conditions, suggesting the therapeutical indications of that remedy; and whatever the flexibility of interpretation of the statements then made, regarding the evidence on which the ammonia treatment is based, it is quite impossible to deny that it contains assertions of a very definite character relative to the curative value of that nitrogenous base.

In considering the testimony bearing upon the theory before us, we wish to know what foundation does pathology lend to it, or whether it lends any, or whether it controverts it; and in dealing with this question I shall not attempt to inquire whether we should regard the cause of typhoid fever as being a parent or a derived form. You must settle that with the biologist; judging however, from the change in type which this disease seems to have undergone in this country within the past thirty years, it would be possible to justify the conception regarding its derivative nature.

Based upon evidence which is open to no doubt and no falsification, we are assured by the most advanced pathologist of the day, that the existence of a bacillus in connection with typhoid fever is a fact; and further, that its association with this disease alone is sufficient to constitute a distinction from all other pathological states, fevers, growths or disintegrations. The pathologist however, does not pretend to assert the etiological position of this bacillus with reference to the disease, and thus far its presence is valuable only as a means to diagnosis.

The next pathological phases occurring in this malady to which I would refer, include nitrogenous waste, the

diminution of fibrine, the deficiency of urea, and all nitrogenous excretion, including the ammoniacal exhalations emitted so abundantly from the lungs, the skin and the kidneys, or rather the urine. These pathological conditions have long since been demonstrated and generally admitted to exist during the evolution of the disease, and it is this nitrogenous metabolism that furnishes the sum and substance of the pathological evidence in favor of the ammonia doctrine.

It was the logical development of this testimony which led to the conception that the bacillus to which I have referred must be a nitrogen feeder; and that the ammoniacal exhalation which take place in the course of this disease results from the consumption of the nitrogenous elements of the body, as the products of the vital processes of that specific organism. That ammonia is the manufactured article, the prepared material of the bacillus out of the nitrogenous elements of the system—and during this process the balance between heat-production and heat-loss is overturned, followed by all the phenomena of the disease. This condition furnishes the basis of an induction which enables us to scale pathological heights considered hitherto inaccessible, and take the logical step from the cause to the effect—from the bacillus to the disease.

It is impossible at the present time to anticipate the ultimate issues of this doctrine; but possibly, when we come to cultivate this bacillus, under conditions that will insure its growth and development to the extent which it attains in the human subject, we may be able to understand how this disease is communicated, how local epidemics originate and how they are propagated; in short, to hunt out the bacillus, and locate its lair among the mountains of nitrogenous matters surrounding the dwellings of civilization, and bring our armamentarium of ideal

antiseptics or germicides to bear upon him, which is at present necessarily restricted to close range.

When I say that the deficiency of urea, manifested in typhoid fever, should be attributed to the life process of an organism—a nitrogen feeder, I am met by the authority of eminent physiologists who would absolutely deny to this theory any physiological foundation, but contend that this nitrogenous waste to which I have referred, was due rather to the fact that, in this disease especially, the glands and glandular follicles, the function of which is to secrete the digestive fluids, are in such a state of engorgement or inflammation as to render them incapable of digesting nitrogenous food. I fully assent to this argument as far as the conditions here referred to are involved, but would emphatically deny any view so restricted touching the sources of this important excretion.

I must admit however, that the question pertaining to the sources of urea excretion, was for a long time a puzzle even to the physiologist, and a few of them held exclusive views on this subject; but we are now prepared to combat such notions, and can offer the most convincing physiological testimony that urea is derived from many sources, not only from the unemployed food taken into the system, but from the disintegration of muscular tissue, from nitrogenous metabolism taking place in the liver, and especially from the disintegration of the blood corpuscles. Thus the theory entertaining exclusive views on the question of urea excretion, may therefore be put out of court.

Another consideration in connection with this question presses here with some force, as it has been suggested that instead of this urea consumption, instead of this nitrogenous waste, it may be simply retained in the system as is illustrated in desquamative nephritis. But in reply to this question I would ask, what evidence have we

that such is the case? Have we any signs of uræmic poisoning, or do we attribute the coma of typhoid fever to that cause? Assuredly not; but we can say with certainty that such is not the case. We can say with certainty that this assumption is not only devoid of any pathological evidence, but that is contrary to that evidence. Thus far I have endeavored to show that typhoid fever is a germ disease; that it is provoked by a bacillus, a nitrogen feeder, and have attempted to lay before you the most natural teachings of the pathological testimony in our possession bearing upon this view; that no inspection of the pathological changes which are peculiar to this disease gives us the slightest right to infer that they are produced in any other way than that which I have just pointed out.

Since the pathologist has cleared the way by so accurately defining the organism which differentiates typhoid fever from all other diseases, we will attempt to produce the therapeutical testimony involved in the question before us, and inquire how far that evidence could be said to be indifferent to the ammonia hypothesis; how far it could be said to be favorable to it, and finally, how far it could be said to be demonstrative. As medical practitioners, we are aware that to a certain extent the tendency of pathological teachings has been to diminish faith and create skepticism in the possibilities of therapeutics; that the *vis medicatrix naturæ* was the best doctor of us all; and this notion became at length the guiding conception of medical thought, and from which developed what is known as the expectant treatment of disease. And it is by no means easy to combat this notion, for when I say that I reduce the temperature in cases of typhoid fever by the cold water method, and have not the slightest doubt about it, the reply is that I only checked heat-loss without modifying the factors concerned in heat-production; and under those circumstances

my clinical thermometer is very misleading. And if I urge that my patient recovered under this method of treatment, the retort would be that I am equally transgressing the limits of fact, for what I really know is, not that my remedy exercised any controlling influence over the natural course of the disease, but that the cold water method did not kill the patient; and the like may justly be concluded from analogy of all our vaunted antipyretics, usually resorted to in the treament of this disease. But if we are to listen to the dictates of the pathologist alone, we would find ourselves constantly going wrong, and the scientific practitioner would indeed be a very poor doctor, "as pathology only furnishes the objects to therapeutics, it does not not embrace or direct it."

From almost the origin of the discussions upon the treatment of the contagious and infectious disorders, an argument has been put forward as an objection to the employment of any known drug with the express view of aborting this class of disorders. This notion involves a question which we shall have to consider very seriously; as we have the highest testimony that the tendency of those diseases is toward recovery—leaving medication out of the question altogether, the sick usually recover, and we find subsequently upon investigation, not the slightest trace of any break in the uniformity of nature's operations; not a symptom, not a shadow of indication (except self protected) that events have followed other than their natural and orderly sequence. But we have testimony at our command that completely and fully negatives that hypothesis; and I confess that I have too much respect for your intelligence to think it necessary to add that negation was equally strong and equally valid, whatever the source from which that hypothesis might be derived, or whatever the authority by which it might be supported.

The facts of this character, and they are numerous, belong to that class of testimony which I have called indif-

ferent; that is to say, they may afford no direct support to the theory of the ammonia treatment, or in fact to any other treatment, but they are perfectly capable of being interpreted in consistency with the ammonia hypothesis; that is, if it is ever possible to so modify the human system by pathological elements as to render it forever afterwards protected, by furnishing its own antidote, its own remedy, as is illustrated by vaccination.

I now pass on to the consideration of the conditions which must exist if the ammonia treatment of typhoid fever is to be depended upon; and these conditions involve a physiological law which declares "that no organism can live in the products of its own vital processes." Undoubtedly this is a necessary postulate to the theory of the ammonia doctrine; and the evidence by which it is sustained is of so plain and so simple a character that it is impossible in any way to escape from the conclusions which it forces upon us. That is the doctrine you will find stated most fully and clearly by M. Pasteur in his criticism of the question propounded by his contemporary M. Bouillaud, and that was, "How can the ferments which are living beings, and which contain materials of the same order as those of all living beings, decompose after the decompositions which they themselves provoked."

This theory illustrates a perfectly determined physiological law, and the scaffoldings erected by the imagination crumble before it, so simple and so demonstrative,—"that no organism can live in its own excreta, in the products of its own vital processes." In this case, the bacillus is the ferment, and the nitrogenous elements of the system is the fermenting substance, which is transformed into ammonia, the life process of the bacillus, and which is absolutely unfit as the life medium of that organism. This is the character of the evidence which I stated to you, that we are bound to meet with if the hypothesis

of the ammonia treatment of typhoid fever be true, and which is strongly in favor of that doctrine.

Thus far I have endeavored to place before you evidence derived from the pathologist and the physiologist which, as I stated, was perfectly consistent with the ammonia hypothesis, in fact was favorable to it, but could not be regarded as the highest kind of evidence, or as that sort of evidence that we call demonstrative.

You are aware that the art of healing owes its greatest achievements to inductive methods; and it is thus that "therapeutics is constantly invading the domain of pathology in new and unexpected directions," and that an inductive hypothesis is said to be demonstrated when the facts are shown to be in entire accordance with it. Now, I will put before you the direct evidence of the ammonia treatment, and will endeavor to be as succinct as possible. This testimony is written without the possibility of mistake, with no chance of error, in the stratified rocks, as it were, of induction and experiment.

In approaching this disease, the physician meets with a system of things of immense diversity and perplexity which he calls typhoid fever; and it has taken long years of accumulated and often fruitless labor to enable him to look steadily at the shifting scenes, phantasmagoria of this malady, to notice what is fixed among its fluctuations and what is regular among its apparent irregularities; and it is only comparatively lately, within the present century, that there has emerged the conception of a pervading order and a definite course of pathological changes, which we term the natural course of typhoid fever, and in a great measure we had come to neglect even as a possibility the notion of any interference with that order.

Taking, however, its birth in the German hot-beds of skepticism, a reaction from the nihilism of expectancy, nurtured and defended by a noble army of scientific investigators for nearly half a century, who reached at length

the pregnant doctrine that the elevation of temperature as it occurs in this disease was the most important pathognomic symptom, and to subdue this excessive heat became the object and aim of all remedial measures. The clinical thermometer was introduced with a purpose, and the temperature could be exactly measured. Numerous remedies were tested and thrown aside as uncertain and unsafe. It was soon discovered that an antipyretic treatment was not necessarily an antifebrile treatment. Wunderlich tested digitalis; and the quinine and cold water treatment assumed immense importance in the hands of Liebermeister and Jurgenson—the results of which are familiar to all of you. The quinine treatment has survived to the present day; that is, it is more generally employed than any other remedy. But the quinine treatment is rapidly losing ground among our foremost scientific men on account of its effects as a cardiac depressant.

I have no experience to record with reference to the sodium and carbolic acid treatment, but I fully agree with Professor Bartholow when he admits that quinine is not an efficient germicide in typhoid fever, as I have shown that the parasite of enteric fever is a nitrogen feeder and an exhaler of ammoniacal gas, and on this principle we only select quinine as the efficient germicide for an organism the excretory product of whose life is carbonic acid gas, and it is not to be expected that the same agent would be equally efficacious in destroying both organisms.

I will not pretend to say how I ought to measure the therapeutical value of ammonia in the treatment of typhoid fever, or whether I should compare it to quinine in paludal infection, or measure its therapeutical value by that of mercury in syphilis, or compare it with salicylate of soda in the treatment of acute articular rheumatism. Happily for my part that is wholly unessential.

But that ammonia, properly administered, exerts a decided controlling influence over the natural evolution

of this disease, there is no sort of question. After experimenting with the nitrogenous salt for the past eight years, I have come to regard it as the only germicide in our possession that will jugulate the malady, and in accomplishing this end, it is the only remedy whose action illustrates the coincidence of the observed facts with theoretical requirements.

And this is what I mean, Mr. President and gentlemen, by demonstrative evidence of the value of the ammonia treatment in typhoid fever. I have purposely omitted any reference to the complications arising in the course of this disease.

SURGERY.

P. H. MILLARD, M. D., CHAIRMAN.

CHAIRMAN'S ADDRESS.

The Treatment of Strangulated Hernia.

Gentlemen:—As chairman of your section, I beg permission to contribute my mite, consisting of a series of my first twelve operations for strangulated hernia.

My sole desire in reporting these cases is to exemplify by statistics, and again appeal to the profession to refrain from delay in resorting to operative procedures in cases of strangulated hernia of whatever kind.

CASE I.

Mrs. W., age 78, widow, had been suffering from an old reducible femoral hernia for many years. While running across the yard to rescue a child from imminent peril she felt her hernia descend; this descent of the hernia was so common that nothing was thought of it until sometime thereafter when it commenced to pain. An immediate attempt was made by the patient to reduce the mass but without success; vomiting commenced shortly thereafter, and I was sent for to visit the patient, who lived eight miles in the country; arriving six hours after the date of strangulation, my patient was found to be suffering with all the symptoms of strangulation; all attempts at reduction were futile, and I placed my patient under a full

opiate, and left orders to be called at daylight. Visited the patient next day at 10 A. M., and found patient unrelieved, and also found reduction by manipulation impossible. Assisted by Dr. A. J. Stone, we placed the patient under ether, and finding reduction impossible I proceeded to operate. Strangulation was found to be at Gimbernat's ligament, and was relieved by the usual incision, and the mass returned without any mishap. The usual antiseptics were used and the patient made a good recovery without any complications.

Case II.

A. C., age 45, occupation laborer. Was called after having suffered with violent strangulation for a period of five hours. Assisted by Dr. Livingstone, we placed the patient under ether and tried reduction without avail; immediately proceeded to operate. Found a very small oblique inguinal hernia with the intestine firmly grasped at the inner ring. Operation completed without any mishap and the patient made good but slow recovery.

In my opinion this patient's life was saved by an early operation.

Case III.

Mr. P., aged 74. Patient had been a sufferer from an old hernia of immense size for many years. While pitching hay he caused to escape a large amount of omentum and intestine, which became immediately irreducible. His attending physician being unable to reduce it by taxis, called me in about three hours after strangulation had occurred. The scrotum and its contents were of immense size and very tender, and symptoms of strangulation well marked. With further consultation it was decided a case for immediate operation, in case of failure to reduce under an anæsthetic. After being placed fully under the influence of ether, taxis was tried, but with a negative

result. I instantly proceeded to operate. Upon opening the sac, I found an old oblique hernia nearly converted into a direct. The strangulating band was evidently the external ring and required extensive divisions to allow the parts to return. The operation was completed without any untoward accident. The patient made a very rapid recovery and was about in ten days. I used thorough antiseptic precautions in operation and dressing. The wound healed by first intention.

Case IV.

R. McG., aged 40. While laughing heartily over an incident at cards, his abdominal walls became so relaxed as to allow the escape of a large knuckle of intestine. Violent symptoms of strangulation became immediately apparent. I was called four hours after the escape of the intestine. I took him to the city hospital at once, and decided to operate if the hernia was found irreducible after a full anæsthetic. Taxis failing, under ether, I cut down and opened the sac; the contents were entirely intestine. The stricture was at the inner ring, and after its division, in attempting the reduction I carelessly raised my hand from the incision in the sac and its contents escaped. This necessitated considerable manipulation of the intestines to reduce it, and consequently increased the danger of inflammation, but happily the patient made a very rapid recovery. The wound healed entirely by first intention, and the patient, contrary to orders, walked a mile the ninth day after the operation.

Case V.

J. S., aged about 50, sent for me November 29th, to reduce a hernia. He had been intoxicated the evening previous, and the intestine escaped under the pad of his truss and remained strangulated fifteen hours before my arrival. Upon examination I found great tenderness of

tumor and constant vomiting and retching. The pain was very great and evidently much swelling. I ordered his removal to the city hospital and called in consulting surgeons. It was decided to put him immediately under ether, and in case of failure at reduction by manipulation, to at once operate. After being fully etherized it was found impossible to reduce the hernia, and I proceeded to operate. Cutting down and opening the sac I found a direct hernia lying under Poupart's ligament. I divided the stricture and reduced the intestine without difficulty, but a large mass of omentum was found firmly adhered to the sac by old adhesions, and which it was found impossible to separate; I consequently ligated the mass with carbolized silk. The operation and after treatment was antiseptic, and the patient made a very rapid recovery.

Case VI.

Mr. R., aged 70, a sufferer with a double hernia for many years. While at work he slipped and caused to escape a mass of intestine that became immediately strangulated. I was sent for four hours thereafter and found the tumor firmly strangulated, and the vomiting and pain very frequent and severe. After consultation it was deemed best to give an anæsthetic and reduce by manipulation if possible, and failing therein, to operate. Patient fully under ether, manipulation gave a negative result. I at once entered upon the operation. Cutting down and opening the sac, I found the contents of the hernia to be a knuckle of intestine strangulated at the inner ring. I divided the stricture and reduced the hernia without difficulty. Antiseptic precautions were used in the operation as well as the after treatment. Patient made a good recovery without any traces of peritonitis.

CASE VII.

J. R., age 45, occupation farmer. Patient had suffered from hernia, noticeably for the last year. Gut escaped and strangulation occurred Tuesday morning. Patient resided in country, five miles out of Marine. Dr. Gaskill of Marine was sent for and saw patient Wednesday morning; found patient in great pain and with frequent vomiting; was unable to reduce the hernia. Dr. Gaskill called again Thursday; found patient much the same, but losing strength rapidly. Friday Dr. Pratt of Stillwater was called in consultation; Dr. Pratt found the patient very weak from persistent vomiting, and suffering from peritonitis. Dr. Pratt was prepared to operate and urged immediate operation, but patient absolutely refused operation. Dr. Pratt returning home ran across patient's brother, and again repaired to patient's bedside. Both urged him to consent to the cutting; they met with firm refusal. Late Saturday night a messenger came to me to come and operate. I reached the house at early dawn Sunday and found the patient in a very depressed and weak condition, but now quite anxious for the cutting. Vomiting at intervals of twenty minutes had occurred since strangulation, and of a stercoraceous character; pulse weak and compressible, countenance anxious but collapse not complete. With the attending physicians I performed the operation of herniotomy, at the same time feeling that death was imminent and a fatal result probable. The proper incisions being made a large amount of omentum was found around the gut. The omentum present was of so low a vitality as to render it unsafe to be returned to the abdominal cavity, I therefore ligated and cut it away. The gut lay in the omentum in such shape as to have escaped direct pressure, and was in a condition to be safely returned. The constricting point was in the inner ring, and after the incisions the gut was easily returned.

The constant vomiting was at once relieved, but the already present peritonitis continued and within thirty-six hours after the operation caused the patient's death.

This is my first fatal case in a list of seven herniotomies. Although sorry to have my uniform success interrupted in this manner, there is yet a grim satisfaction in the lesson it teaches of an early operation. It neatly illustrates, when set in apposition with the early operations, and bears out the practice advocated in my former writings. It gives a practical and scientific judgment, but for which an operation in this case would have been partially valueless. At the present stage of abdominal surgery I deem it improper to make an artificial anus where the vitality of a section of the gut from any cause is lost, and in preference resort to an immediate resection of the worthless portion and return the gut to its natural place.

CASE VIII.

J. C., age 35, occupation cook. This patient had suffered with an oblique inguinal hernia many years. It was reducible and had been generally controlled by a suitable truss. Recovering from the loss of both feet by freezing he was able to get about without any inconvenience from his old rupture. From over-exertion he got it down and it became strangulated. I was called to reduce it six hours thereafter. The strangulated mass was about the size of a hen's egg. Finding it impossible to reduce it by taxis, I sent for ether and determined to try reduction under a full anæsthetic, and failing therein to immediately operate for the relief of strangulation, and also make the operation known as "Wood's operation for the radical cure of hernia." Finding reduction impossible under an anæsthetic I immediately proceeded to operate with the assistance of Drs. Voigt, Clark and Merrill. The herniotomy was completed without any difficulty, and the "operation for the radical cure" proceeded with. After carefully

dissecting the sac from its adhesions as far up as its inner ring, I ligated it and cut it away with the scissors, passing the sutures forward to include the conjoined tendons and bringing the parts together and using pressure, operation was completed. The patient made a rapid recovery without a bad symptom. Three months after the operation the patient had experienced no difficulty from his old rupture and the tract was practically obliterated.

Case IX.

J. T., age 35, occupation laborer. Was called to see this case in consultation. Found patient suffering from an oblique inguinal hernia; symptoms of strangulation well marked. Strangulated mass about the size of a goose egg. Moderate taxis having been attempted unsuccessfully, patient was placed immediately under an anæsthetic. Finding reduction impossible, with the assistance of Drs. Voigt and Merrill, proceeded to operate. Strangulation found at inner ring. Operation completed without any complication. Dissected out the sac and made the operation known as "Wood's, for radical cure of hernia." Patient made a rapid recovery without raise of pulse or temperature. Hernia has never descended far enough to cause patient any trouble, and can say that the operation for radical cure was fairly successful.

Case X.

Captain P., age 79, retired. This patient had suffered with a large sized hernia for many years. While overexerting he suddenly commenced to feel pain in the scrotal regions and found it impossible to reduce his rupture which had just slipped out. I was called and the hernia mass being quite large I considered it safe to attempt reduction by taxis; failing in the attempt and the patient refusing to allow me to give an anæsthetic at this time, I gave a full opiate, and awaited eight hours, or until morn-

ing. In morning found patient with all symptoms of strangulation. Gave an anæsthetic and found it impossible to reduce by gentle taxis. With the assistance of Drs. Voigt, Clark and Merrill, I proceeded to operate. Found the strangulation at the external ring, and the operation was completed without any accident, and the patient progressed finely for the period of eight days, the wound had healed and patient was able to sit up. At noon of the eighth day patient had distinct chill with considerable pain in right side; some cough, which was attended with considerable pain. Physical exploration reveals a well marked pneumonia, probably of the congestive type. Patient sank rapidly and died in thirty-six hours.

This is one of the rare forms of death that is liable to follow any severe surgical operation, the liability thereof increasing with the age of the patient.

Case XI.

Mrs. G., age 60, occupation house-wife. Patient had suffered with large-sized femoral hernia many years. From unknown cause had become suddenly strangulated. A physician being called overlooked the cause of suffering, and patient was allowed to suffer for the period of thirty hours before receiving proper surgical attention. Being called in consultation Tuesday, placed the patient under an anæsthetic and immediately proceeded to operate. Finding it impossible to reduce the mass by gentle taxis, with the assistance of Drs. Marshall and Merrill, proceeded to operate. Found a large mass of omentum in a gangrenous condition, which I ligated and removed with the scissors. A knuckle of intestine was found strangulated at Gimbernat's ligament. Operation was completed without any complication. Patient made a slow but complete recovery.

CASE XII.

Mrs. B., age 65, occupation house-wife. Sufferer from an old femoral hernia of many years. While returning from church her attention was directed to a pain in the region of her hernia. On arriving home vomiting, and upon examination found the hernia down, and unable to reduce it. Was called to see the case three hours thereafter and found well marked symptoms of strangulation. Consultation being held it was decided best to place patient under an anæsthetic and endeavor to reduce by gentle taxis. Assisted by Drs. Watier of Stillwater, McComb of Duluth, and Merrill of Stillwater, I proceeded to operate. Found a small knuckle of intestine strangulated at Gimbernat's ligament. Operation completed without any complication. Patient made a rapid recovery without rise of temperature or pulse.

The proper treatment of strangulated hernia has received renewed attention by the surgeon of late years, and the same promptness in resorting to operative procedures have been manifested here as in other fields of abdominal surgery. The recognized treatment of strangulated hernia to-day is by taxis and herniotomy. Opium in large doses, hot sitz baths and ice have had their day, and should, in my estimation, be rarely resorted to, and then only for their palliative effect. Upon the examination of a case of strangulated hernia, the surgeon should ascertain with great care the history of the case. If we have enterocele to deal with, and especially if it be of small size, it should be manipulated with the greatest care, else we will do irreparable harm. If we have epiplocele, taxis is attended with little danger. If an entero-epiplocele, taxis is attended with somewhat less danger than with the first variety or enterocele. If we have a recent hernia of the inguinal variety, and the contents of

the sac is intestine, then a very moderate amount of manipulation, even under chloroform, is attended with the greatest danger. In the mixed variety of hernia, entero-epiplocele, if of a large size and limited to a well dilated inguinal canal, a moderate amount of manipulation is well borne, especially if the force is directed properly. The surgeon should not attempt to reduce a strangulated hernia until his patient is etherized, unless the symptoms are those indicating a light degree of strangulation and the hernial mass of large size. Under these circumstances reduction is sometimes easily accomplished without the aid of an anæsthetic. If we have an enterocele of small size and the symptoms of strangulation pronounced, an attempt at reduction should not be made until our patient is thoroughly under an anæsthetic.

Crural or femoral hernia should not be manipulated unless the patient is thoroughly etherized. It should be the established rule of surgery that when we are unable to reduce strangulated hernia of whatever kind with gentle taxis, to proceed immediately to operation of herniotomy. Having been called to see a patient suffering from strangulated hernia, and if called in the usual space of time that we are usually called at such cases, if we immediately operate, after being unable to reduce by gentle taxis, the danger from subsequent peritonitis is practically trifling; if, however, we delay operative proceedings, after having failed to reduce by taxis, our patient's life is greatly imperilled thereby. Procrastination in this case is, in my mind, criminal, and statistics in cases that are operated upon early show a very low mortality; but in the cases where operative procedures are delayed for the twelve or fifteen hours that follow, fifty per cent. die. While the successful surgeon is always conservative and slow to adopt radical measures in nearly all other fields, surgery in strangulated hernia delayed is little less than criminal, every hour adds to the danger which it is his duty to diminish.

The frequency and existing importance, in any case, of its becoming dangerous to leave it, make hernia deserving and demanding practical consideration of every practitioner. Of the three-fourths million deaths reported to the census bureau in 1880, one in six hundred, or twelve hundred and thirty-six deaths were from strangulated hernia. The radical change of views of the profession as to the course to pursue in strangulated hernia is parallel to the change of views respecting abdominal surgery in general. It is my opinion that by early operation in strangulated hernia we may get a reduction of the mortality of fully twenty-five per cent.

The surgeons of former generations were taught to believe that the peritoneum was the most liable to inflammation of any organ or tissue in the body if wounded or injured in any manner, but to-day, under the following of the immortal Lister, we ascertain that our former views were a fallacy, and that by exercising thorough cleanliness we can invade this delicate and important membrane with a boldness heretofore considered invariably fatal. We therefore find the mature surgeon directing our attention to the propriety of adopting some operation looking to a radical cure when compelled to make a herniotomy. I would recommend that the Wood operation be made upon all cases where practicable, at the time of making the herniotomy. I made the operation in three of the above cases and saw no increased tendency to peritonites thereby.

In conclusion allow me to disabuse your minds of the popular belief that a herniotomy is one of the formidable operations of surgery. It is true emergencies may arise requiring great judgment as to the proper course to pursue, but that under ordinary circumstances it is not a formidable operation is certainly my experience.

SURGICAL TREATMENT OF LARYNGEAL STENOSIS.

BY C. H. HUNTER, M. D., MINNEAPOLIS.

It is the purpose of this paper to pass in review the more frequent indications for surgical interference in stenosis of the larynx, and then to make a comparison between the two metheds of relief now in vogue, viz., tracheotomy and intubation,—with a more or less detailed enumeration of cases of the latter operation that have come under my observation.

Narrowing of the larynx may take place acutely or chronically. In either case the immediate danger is suffocation. The immediate indication then is to obtain free access of air to the lungs, or in chronic stenosis to secure this result while permitting the application of appropriate remedies for the removal of the laryngeal obstruction.

Such access of air may be obtained by keeping open with a hollow tube the natural opening, or by making an artificial opening into the air passages below the obstruction. Both methods are ancient, as we shall see, for the trachea was opened as early as the first century B. C., while Hippocrates mentions that canulæ should be passed into the throat that air may enter the lungs.

The usual pathological conditions that may end in stenosis are, tumors in or about the larynx, acute inflammation ending in œdema, or formation of a croupous membrane, or chronic inflammation ending in indurations, scars and deformities of the tube. Foreign bodies in the air passages would be a separate source of obstruction. Their removal requires usually an artificial opening in the trachea. As the surgical procedure for the relief of the stenosis is independent of pathological conditions,

we need not delay to discuss them. Suffice it to say that nine times out of ten when we are called upon to relieve stenosis it is due to an acute inflammation of the larynx, diphtheritic or croupous in its nature.

The object is to ease the respiration and thus gain time for the disease to run its course. Until recent years the only recognized operative procedure to gain this end was *tracheotomy*. Cutting into the trachea is a very old operation. Galen credits Asclepiades with the first operation as early as 100 B. C. Paulus Æginita wrote of and practiced it as late as 600 A. D. This gives some 700 years in which the operation was current among ancient physicians. All ancient learning was at this time buried for 1000 years under the wave of barbarism from the north. Medical as well as other learning became Saracenic. But the Arabians were not surgeons: tracheotomy was known among them only as a possibility. In the revival of learning in Europe the Italians took the lead. As early as the thirteenth century their doctors revived the practice of opening the trachea.

Sanatorrius first used the trochar to hold open the wound—1596. Pare (1610) spoke against the operation. A century and a half later Geo. Martin first used the double canula. It was at this period that Heister used for the first time the term *tracheotomy*—1743. The Scotch surgeon Home was the first to propose it for croup in 1765. The great Van Sweter opposed it. Bretonneau, after several disasters, saved a case in 1825. Trousseau followed soon with another successful case. He worked out the details of the operation and its after-treatment with so much pains, enthusiasm and success that the tide fairly set in its favor by 1833, to be followed a little later by a reaction—for Perrie, in 1852, says there is little hope of success in croup.

Evans in 1859 urges against the best English authorities that tracheotomy be done, first (1st), because of the

high rate of mortality in croup; second (2d), the immediate cause of death is asphyxia; third (3d), recoveries take place even when the patient is moribund. In 1863 Roser reports that the operation is gaining in favor. In 1868 Durham introduces the angular tube with his pilot handle.

Senator in 1874 writes, tracheotomy is indicated in every case in which the air passages are blocked with membrane and mucus. It should be done to gain time, whether the obstruction is in the larynx, trachea or bronchi, or even if secondary changes have already begun in the lungs. No one is justified in saying the chances of tracheotomy are unfavorable, for this might dissuade from operating.

No one would, I fancy, refuse the operation to a patient restless, tossing about struggling for breath, clutching wildly at its mother's hair, face or breast in vain endeavor to satisfy its breath hunger. Only after repeated failures to save life at least (as would likely enough happen) would this euthanasia be withheld.

Here arises the interesting question as to how many lives tracheotomy saves. To determine the mortality rate of diphtheritic laryngitis when treated with medicine alone is not an easy matter. Waxham estimates that one-third (⅓) recover. Mackenzie says ten per cent. Gay in his paper read before the Am. Surg. Assoc. in 1884 has collected varying results from various sources, viz.

35 cases	with	15	recoveries,	Meigs & Pepper.
21 "	"	7	"	J. L. Smith.

Agnew estimates the recoveries in Am. practice at fifty per cent.

33 cases	3 recoveries,	Ware.

30 to 40 cases of recovery from thirty doctors in Mass.

40 "	in Boston City Hosp.,	0	recoveries.
79 "	Philadelphia,	19	"
62 "	Gay,	20	"

Three recoveries in 20 years at Boston City Hospital.

I have myself never seen a well-marked case of croup get well under medical treatment, so that I am inclined to think the per cent of one in four is quite high enough to do full justice to the medical treatment. Does tracheotomy do more?

So far as I have examined the statistics, from 28 to 33 per cent recover. Cohen has had much better success than this, one series of selected cases numbering 166, showing 70 per cent recoveries. Dr. Agnew gives a collection of 11,696 cases, showing 26 per cent recoveries. Dr. Waxham reports more damaging statistics of the operation in Chicago.

By inquiry I have learned the results of 119 tracheotomies in Minneapolis, St. Paul and Stillwater, distributed among twenty operators. The number of recoveries is 37 or 31 per cent. The largest number by any one operator is 18, with 5 recoveries, 27 per cent. The best record is 14 cases with 6 recoveries, or 44 per cent. The largest number has occurred in boys, corresponding with the general experience. Very few or no deaths attributable to the operation have occurred. In two instances hemorrhage, it was thought, might have hastened the fatal issue. On the other hand in one instance recovery resulted after life had been pronounced extinct. I have performed the operation three times, and though all three resulted fatally, death was in no way due to the operation. In each instance the membrane continued forming in the trachea and bronchi. All my operations were performed before there was marked cyanosis or stupor, but not until it was plain that it was absolutely necessary.

All operators are agreed that the chances of success are decidedly better if the operation is done early. As soon as restlessness comes on, Roser says. Recession at the epigastric and intercostal spaces is Mackenzie's guide. Increasing croupy breathing, epigastric depres-

sion, modified vesicular murmur over one or both chests, and aimless tossing about, make a group of symptoms plainly indicating that further delay is vain, vitality is exhausted by the lengthened struggle for breath, atalectasis appears *in* the partially collapsed lungs forming foci for a subsequent broncho pneumonia. I have always used an anæsthetic. I should now use a hypodermic of cocoaine. The operation itself is not difficult nor dangerous. The essentials are coolness, to make haste slowly, cut no vessels, tear the tissues boldly in the median line till the rings of the trachea are seen glistening at the bottom of the wound. Have all hemorrhage stopped before opening the trachea. The Durham tube and pilot will on the whole give the best satisfaction.

Final success depends upon the after-treatment. This must be left night and day in the hands of some person known to be competent. Dr. Abbot of Minneapolis, whose statistics are 44 per cent. recoveries, says he has never saved a case except it were left with a student or medical man.

Most nurses have not had the training, nor have they the nerve to meet the emergencies that may arise. The tube must be kept in and its calibre free,—steam spray, frequent moistening directly into the tube with spray of salted water every five minutes, frequent removal and cleansing of the minor tube every two hours, with occasional passage of a feather into the trachea, will accomplish this purpose most effectually. A certain number of cases will be saved that would otherwise die. Euthanasia will be brought to nearly all. We should not then hesitate to urge the operation, and that, too, early.

In January, 1880, Dr. O'Dwyer of New York reported that he had relieved the stenosis of croup by placing a hollow tube in the larynx and keeping it there till the patient got well or died.

General attention was not attracted to the operation,

however, till the past year. During the past twelve months, owing to the labors of Waxham of Chicago, of Northrup and of O'Dwyer himself, the doing of intubation has become so common throughout the states that orders for instruments far surpass the capacity of our surgical instrument houses to supply them. An admirable account of the evolution of the tubes in Dr. O'Dwyer's hands is given by Northrup in the Medical Record for December 11, 1886.

The literature of the subject is rapidly accumulating. My own experience of intubation is limited to nine cases, with three recoveries, and to three cases seen with Dr. Skaro.

Case I.

I had had the tubes but twenty-four hours with no opportunity for practice on the cadaver, when a case was kindly referred to me by Dr. Skaro. The case presented the usual history: Boy two years old, faucial diphtheria four days, croup two days. I found the child with temperature 100°; pulse 90; respiration labored, stridulous, cyanosed, stupid; chest retracted.

Assisted by Mrs. Aldrich, a student, who held the child, and by Dr. Dusen, I attempted to place the tube. At the first attempt it passed into the pharynx; the second into the larynx, but did not remain; the third into the larynx, but out again; and a fourth attempt into the pharynx. The manipulation had however relieved the dyspnœa. I left the child till evening, when I askd Dr. Braunstein, as being more used to manipulation in the larynx than myself, to make the attempt. The tube passed into the larynx, but did not stay. Again, however, the dyspnœa was relieved. We left the child till early morning, when the stenosis again became very marked. Assisted by Dr. Bracken and the father, I inserted the tube at the first attempt in a few seconds, and made it stay.

I had caught the knack of the operation, for it is nothing more, which I think to be this: Have the child well confined, well held and well gagged; have the tube threaded, with thread caught over index finger of hand holding the obturator. Pass the index finger of the left hand to the root of the tongue, hook forward the epiglottis, hold the tip of the finger at the rim of the larynx; *keep it there;* pass the end of the tube along the antero lateral quarter of the index finger till it reaches its tip on the rim of the larynx, raise the right hand quickly and high, the tube enters the larynx, slips down till its head passes under the tip of the left finger; now push off the tube and remove the obturator, all the time retaining the left finger in position on the end of the tube till coughing has ceased.

The two important points are to keep the finger on the edge of the larynx till the head of the tube has passed under it, and to raise the right hand rapidly in inserting. Dr. Waxham says the finger should pass to the posterior rim, and the tube be passed along its palm or surface instead of at the side.

Our patient now breathed easily through the tube, drank a cup of milk without difficulty, except at the end cough was excited. A great quantity of tough mucus was coughed up apparently through this tube. All went well for the first two days, when the membrane invaded the nasal cavities, completely plugging both nares for the next two days. The temperature was about 102°, pulse rapid, glandular involvement appeared and other septic symptoms. The fourth day he refused food and milk. At the end of four days and eight hours, assisted by Dr. Skaro, I removed the tube, succeeding quickly at the first attempt, and reinserted with equal ease. The dyspnœa returned without the tube. The fauces and nose were now nearly clear but our little patient was badly poisoned, much exhausted and refusing food. He died at the end

of the fifth day after intubation, of exhaustion, not having suffered for a moment from stenosis while wearing the tube. [I show you the larynx with the tube in position. There is the least possible abrasion at the acute angle of the cords with slight injection at its margin.] Thus ended my first case.

Case II.

The next case was in a little fellow, eighteen months old, I had discharged three days before, cured of a faucial diphtheria. After a slight exposure croup developed and was well marked in the second day. Assisted by two students, Mr. Fenner and Eitel, I inserted the appropriate tube without any accident or difficulty. The breathing was at once as quiet as though nothing was the matter. At the end of twenty-four hours the respirations became rapid, the pulse quick, the temperature a beat higher, the vesicular murmur roughened more on the right than on the left; evidently the process was extending downwards. The patient succumbed under the most distressing dyspnœa, unrelieved by either calomel or emetics or alkalis. I removed the tube thinking the obstruction might be there but found it clear. It was reinserted.

Case III

Was a patient referred to me by Dr. Woodward. A boy aged eight had had sore throat for a week; his sisters had had well marked diphtheria three weeks before. New Years he was out sliding; that night the breathing became croupy. Two spots about the size of a split pea, one on the right tonsil the other on the left posterior pillar, showing no tendency to spread. In forty-eight hours the stenosis became well marked; respiration 15, pulse 72, breathing stridulous, chest retracted, cyanotic. Assisted by Drs. Skaro, Woodward and Lars, I had no difficulty in inserting the tube beyond the trouble of holding the boy.

This boy had no difficulty in talking nor in swallowing while wearing the tube. There were no untoward symptoms. The tube was removed on the sixth day. Recovery took place on simple sustaining treatment.

CASE IV.

Girl, age six, referred by Dr. Skaro, had had diphtheritic pharyngitis and laryngitis two days. Local symptoms bad, general symptoms not so bad. The tube was introduced at the second attempt without difficulty. Stenosis relieved at once. Recovery in about a week.

CASE V.

Boy, age three, referred by Dr. Skinner. Deposit was confined to the larynx. General symptoms not bad. Assisted by Dr. Salisbury and a student, I easily introduced the tube. Stenosis relieved at once. The tube was coughed out the fourth day. It was unnecessary to reinsert it. Good recovery.

CASE VI.

Boy, age two. Assisted by Dr. Greene, who called me to see the patient. I introduced the appropriate tube with the effect of immediately relieving the painful breathing. The little patient was, however, badly poisoned, and succumbed on the second day.

CASE VII.

Boy, age four, another patient of Dr. Woodward's, had marked stenosis, wore the tube a week and died of exhaustion. The tube first inserted was coughed up, reinserted, and again coughed up. A larger tube was now inserted, which remained in place. Marked stenosis did not, either time the tube was coughed up, return under three or four hours.

Case VIII.

Girl, age five, I was called to see at the Northwestern Hospital by Dr. Mary Hood. She had been sick eighteen days in the hospital with typhoid fever. For two days she had had laryngitis with patches in the pharynx. The stenosis was marked, but quickly relieved by the tube. At the end of twenty-four hours the difficulty of breathing returned; there was constant cough, expectoration of tenacious mucus, rapid breathing and inability to swallow fluids. Though it was not plain that the difficulty was at the tube, on the urgent request of Dr. Hood I removed the tube without the slightest difficulty, and with it a lot of mucus. The breathing seemed easier, but got worse, so that after a few hours it was deemed best to reinsert the tube. The child, now very feeble, but not apparently hopelessly so, was pinioned and gagged. I was about to put my finger in its mouth to insert the tube, when it stopped breathing. A peculiar palor spread over its face. The child was dead. Attempts at artificial respiration were of no avail. The tube was quickly inserted and the efforts repeated, but to no purpose. At the autopsy I found the typhoid lesions of Peyer's patches (ulcers). The larynx was very much injected, and almost completely covered by a thin, pinkish-white membrane, easily stripped up. There was no perichondritic abscess nor ulcer. This was, I presume, one of those forms of croupous laryngitis described as occurring rarely in typhoid variola and other infectious diseases. There were no cases of diphtheria before nor after in the hospital.

Case IX.

Girl, age 3, also from Dr. Woodward. The croupous breathing succeeded several days of pharyngeal diphtheria. It was quickly relieved not to return, by the tube. We were not in the house ten minutes. The child died

on the fourth day, of exhaustion. An abundant purulent dicharge came out through the tube. This is a bad sign, whether seen in intubation or tracheotomy.

Dr. Skaro, of Minneapolis, has performed intubation seven times. In three of these cases I was present and assisted the doctor. Only in the first was there the slightest difficulty in inserting the tube. This little girl had a marked stenosis, was very restless and struggling for breath. Immediately the gag was removed she said, "Mamma, I feel better; give me some milk." She died the next day, suffocated by extension of membrane downward. Tracheotomy was refused.

Only one of Dr. Skaro's cases have recovered, and that a boy. Dr. Abbott reports three cases quickly and easily relieved. There is one recovery. This gives 19 cases to add to the 514 cases collected by Dr. Ingals, and 5 to add to the 134 recoveries reported by him, with 10 cases and 2 recoveries reported in last week's Boston Med. and Surg. Journal by Dr. Prescott from the Boston City Hospital. A grand total of 543 cases and 141 recoveries or a per cent. of 25.8 per cent., 26 per cent. Statistics still slightly in favor of tracheotomy. If there is an advantage in early removal of the stenosis this difference should be in favor of intubation. Nevertheless for the present I shall not do tracheotomy again for croup. No argument is necessary to obtain consent for operative interference. The operation is infinitely easier, requiring no skilled assistance. The after-care is easy and occasions no such anxiety as does tracheotomy. The comfort of the patient is greater. Accidents are not in my judgment more likely to happen in the former than in the latter: certainly bad after-results are not so likely to happen in intubation.

Dr. O'Dwyer's explanation of the difficulty in swallowing, i. e., engorgement of the epiglottis, seems to me the correct one. When this occurs rectal alimentation may

be resorted to, but not till then. Death after both operations alike follows from increase of the local or of the general symptoms. Tracheotomy I shall reserve for cases unrelieved by intubation in which the trachea is plainly full, when I propose to lay the windpipe wide open, cutting three or four rings and stitch the skin to the mucus membrane to stop bleeding, prevent infection and keep the tract open.

My croup bag shall now contain both intubation and tracheotomy instruments, together with Waxham's forceps for removal of loose membrance. There is a great difference in the intubation instruments on the market: none but those bearing the names of the best makers should be bought. The cheaper sort do not work easily.

In December last a servant girl, a patient of Dr. Van Cleve, was kindly referred to me. She had had twelve years ago and when twelve years old, a tracheotomy performed for croup. She has never been free from dyspnœa since. After a cold the attacks are very distressing. With the laryngoscope a faint white band just below the vocal cords corresponding to the external scar can be seen narrowing the calibre of the trachea. Electrolysis we know will dissolve scars of this nature very happily.

I made an electrode of the largest of O'Dwyer's tubes by passing a fine wire, such as are used in electric work, through the hole for the thread, varnished the tube to near the end, so that the electric stream should reach only the scar, and connected it thus prepared to the negative pole of six cells of a McIntosh galvanic battery. At my clinic at the Minneapolis Hospital College November, 1886, assisted by Drs. Van Cleve and Braunstein, I inserted the tube in the usual manner. The galvanic current was now turned on. Considerable cough was excited, but she breathed without difficulty for the eight minutes the current was passing. The breathing was markedly better and remained so. She left the hospital soon after, since when

I have not seen her. I see no reason why the entire scar may not be safely removed in this manner.

How often this accident of chronic dyspnœa follows tracheotomy I am not prepared to say. Dr. Wheaton of St. Paul writes me of two cases he now has under observation. I have seen one case where the voice cannot be raised above a whisper. These results have not followed intubation. Dr. Waxham reports having used the O'Dwyer tube as an electrode in one case in December last in acute stenosis. They have not, so far as I know, been used in chronic stenosis to carry an electrolytic or other current. I see no reason why scar tissue could not be as easily removed from this locality as from the urethra or rectum.

If further experience should prove the feasability of the measure, we should possess a good substitute for the tedious means of dilation now in use, and the field of usefulness of Dr. O'Dwyer's suggestion correspondingly broadened.

CASES OF INTUBATION OF LARYNX.

BY E. J. ABBOTT, M. D., ST. PAUL.

M. H., female, aged three; was brought in twelve miles from a farm March 17. Was seen by Dr. C. E. Smith on the morning of March 18. Dyspnœa was decidedly pronounced and cough croupy. Case was seen by me with Dr. S. on the evening of the 18th. No membrane was visible in throat, skin dusky, lips and finger nails blue. O'Dwyer's tube was at once introduced. The relief was

instantaneous; dyspnœa ceased and the child in a few moments sank into a quiet slumber.

Next morning when seen the child was sitting up in its crib playing as if nothing was the matter, could eat and drink without trouble. Patient remained comfortable throughout the day. In the evening some diphtheritic membrane appeared in the pharynx.

On the morning of the 20th the tonsils and part of soft palate and uvula were covered with diphtheritic membrane, and symptoms of depression and heart failure increased during the day; the lungs became engorged and death occurred shortly after midnight.

N., male, age one and one-half years. Was called by Dr. Shimonek in the evening to see the child. It seemed a hopeless case from the start but we decided to give the child what chance we could. Some membrane was visible in the pharynx. At the first attempt to introduce the tube it was put into the æsophagus, from which however it was easily withdrawn by the thread attached. The next attempt succeeded and the dyspnœa was at once relieved.

The child passed a quiet night and was reported by Dr. S. in the morning as doing nicely. In the afternoon it was attacked with a violent spell of coughing and dyspnœa, during which it ejected the tube. The tube was found completely filled with a piece of diphtheritic membrane which had exfoliated from the trachea and passed through the tube extending half an inch out of each end. If it had not succeeded in coughing out the tube the child would certainly have choked. As the child's breathing was comparatively free the tube was not reintroduced till next day, when the dyspnœa recurring Dr. S. inserted the tube, but with no benefit. The obstruction evidently extending below the end of the tube. The child died that evening.

E. J., male, age three years, was attacked with measles June 2d, which ran the usual course. June 5th in the night he became croupy, and his mother administered her usual household remedies of ipecac and alum without benefit. The child steadily grew worse, and at noon Dr. C. E. Smith was called. I saw the case with him at 3 P. M. The child had a croupy cough, ashy colored skin, severe dyspnœa, sinking of supra and infra sternal notches and retraction of lower ribs at each respiration. The dyspnœa had steadily increased since Dr. S. first saw the child.

The relief on the introduction of the tube was not as immediate as in the other case; there was considerable coughing and retching and evidence of discomfort, which might perhaps however be attributed to the emetics given.

The case progressed favorably, and the tube was removed after having been three days in the larynx. After removal of the tube there was still a croupy cough but no dyspnœa. This croupy cough is at present improving, and the child is apparently well.

Comparing my experience with O'Dwyer's tubes with my experience in tracheotomy my preference is decidedly with the former; there is no anæsthetic, no blood, no cutting. In my first case when I suggested the introduction of a tube, the mother said with great vehemence that if her child must die it should die without having its throat cut; but when the new method was explained to her, she consented at once. The introduction of the tube is so rapid, and so free from the—to the friends—harrowing accompaniments of a tracheotomy that it must meet with favor when compared with the other.

It seems to me, however, that its greatest advantage lies in the entire absence of any need of after-treatment so far as the tube is concerned.

The constant bother of maintaining an even, moist, temperature of a high degree, and still worse trouble of keeping a trachea tube clean,—and it is almost impossible to find a nurse who can or will properly attend to one—make life almost a burden to patient, family and doctor. With these tubes one can leave his patient feeling that he is not dependent entirely on the faithfulness of an attendant, and that barring the unusual occurrence in my second case there is no danger of the tube becoming obstructed.

Another advantage is that the O'Dwyer tubes are applicable to the large proportion of cases where the necessary after-treatment of a tracheotomy is entirely out of the question on account of the poverty and bad hygienic surroundings of the family.

There have been several notes in the medical journals as to the advisibility of rectal alimentation, owing to difficulty of swallowing. In my cases, except an occasional coughing spell due to hasty drinking, there has been no trouble.

GLANDERS.*

This is a specific disease peculiar to the horse, originating from a specific poison, which is contagious and is transmitted from horse to man through the secretions of the throat, nose, or the purulent discharges from farcy abscesses, when the discharges or secretions come in contact with mucous surfaces or abrasions or cracks in the hands. The infection may also be transmitted to the groomsmen through the atmosphere of the barn if they sleep near glandered horses, or drink from the pail used to water them.

The disease may be communicated from man to man by the pus of farcy abscesses coming in contact with abraded

*The author of this article has neglected to sign his name to it.

surfaces, or from drinking and eating with the same dishes used by glandered men,—notwithstanding the degree of contagion is very mild. The period of incubation varies from two to fifteen days, but is usually about five days. This period is followed by the stage of invasion, which is ushered in by a feeling of depression and a loss of appetite, with pains in the back, limbs and head, which are followed by chilly sensations, alternating with flushes of heat. The pains in the limbs, axillæ and neck simulate rheumatism, often being confined to the joints and insertion of muscles, and at times very severe.

The fever may simulate the continued type or become remittent, especially in sub-acute or chronic glanders. The pulse ranges from normal to 120 beats per minute, depending on the type of the attack. The temperature ranges from normal to 104. In the acute cases from thirty-six to forty-eight hours after the period of invasion a protracted chill may occur, followed by a high fever and a profuse and drenching perspiration. This form of the disease runs a rapid course, with short and labored breathing, quick pulse, excessive thirst, and the fever of a typhoid type.

Sometime during the disease the eruption makes its appearance. In acute cases it may appear soon after the period of invasion, or not until weeks have elapsed in chronic cases. We first find on different portions of the integument a circumscribed erythematous blush with papular red spots about the size of a pea or much larger, which feel shot-like, simulating small pox. These spots soon change to vesicles which become pustular, of a very deep yellow color. The pustules, with their indurated bases, soften down, and we have an excavated ulcer with abrupt edges filled with bright yellow pus. They may occur on any portion of the body, but as a rule we find more on the face, neck and abdomen—the bridge of the nose being a favorite location. When they affect the mu-

cous membrane of the nose, we first have a clear and thin discharge, which soon becomes thick, tenacious and puriform.

The disease shows itself in three forms. In one form the attack seems to be confined to the mucous membranes of the throat, nose, and the submaxillary or sublingual glands of the neck, and is called glanders. In the second form the mucous surfaces seem to remain in a healthy condition, and the lymphatics of the entire body seem to be the objective portions of the system on which the poison produces pathological changes which give rise to inflamed and enlarged subcutaneous glands following the course of the lymphatics in different parts of the body, ranging in size from that of a pea to a hazelnut, giving the skin a roughened appearance simulating tubercles. This form of the disease is called farcy, or farcy buds.

The third form of the disease so closely simulates pyemia that those not familiar with glanders will be misled and call the disease pyemia, until the eruption makes its appearance, which is one of the pathognomonic symptoms of glanders. In this form of the disease we have no catarrhal symptoms of the throat or nose; both remain in a normal condition. Neither do we have any indication of *farcy buds*. This form seems to be characterized by its chronicity, gradual depression of the vital forces, profuse and drenching sweats, fever of a remittent type, suppurating abscesses, pustular eruption and rigors. This division of the disease has been added to fill the missing link between glanders, farcy and pyemia, based on the case to be soon reported.

Before reporting the case, I will ask your indulgence a few moments to the post mortem appearance in two cases without a nasal discharge, as reported by Pollard Holmes System, Third Edition, Volume 1st. "The first patient died after an illness of twenty-one days,—no trace of a nasal disease. The blood found fluid, the muscles soft

and rotten, the cervical and left parotid glands suppurating; the lower part of the right lung solid with gray hepatization, its tissue entirely broken down and infiltrated with purulent fluid. The second patient died on the thirteenth day. There was no affection of the lymphatic glands, but suppuration had taken place in the muscles in both calves of the legs, accompanied by local abscesses in other parts of the body; lobular pneumonia in the upper portion of the right lung with gray hepatization."

The prognosis of glanders is unfavorable. The acute form of the disease is nearly always fatal. Of fifteen cases reported by Royer only one recovered. In ten cases reported by the same man, of chronic glanders, seven recovered. Other writers set the average at fifty per cent. in chronic cases.

John Walling, twenty-five years of age, native of Norway, residence Harmer, Minnesota, came to my office June 14th, 1886, without being able to give any history, only that he had been sick four weeks, and the last two weeks had been unable to do any form of work. During this time his left arm and calf of right leg were very painful and swollen, simulating an acute attack of rheumatism. The patient was very much debilitated and appeared as though he was recovering from a severe fit of sickness. Temperature ranging from 100 to 102. Pulse 100 and feeble. On examination of the swollen arm we found a fluctuating tumor at the insertion of the deltoid, which was opened, and discharged half a pint of offensive pus. The calf of the swoolen leg was hard and gave no evidence of fluctuation.

The patient came to the office two or three times after his first visit; but owing to the lameness of the leg and increasing feebleness, he discontinued his office visits, and I visited him at his residence. The swelling in the leg began to give evidence of a deep-seated abscess, which

was opened and a large quantity of offensive pus was discharged, and the cavity thoroughly syringed with warm water two or three times a day; also the abscess in the arm. Within forty-eight hours abscesses were formed on one ankle and foot, which were opened and treated like the former abscesses. The first indication of an abscess was pain, swelling and a circumscribed erythematous condition of the integument preceding the fluctuation from two to three days. During this period the patient was gradually growing weaker with night sweats and a temperature ranging from 100 to 103.

Three weeks from his first visit to the office have now elapsed, and the abscesses seem to increase in number, especially on the hands, arms and feet. The night sweats from this time until his death became drenching and excessive, saturating the clothing and bed, much more severe than the first three weeks of treatment. The discharge from the abscesses opened continued, and new ones on different portions of the limbs continued to form. During this abscess and sweating period, the vital forces were gradually failing, and the patient growing more helpless. One week before death, pneumonia of the left lung was added to the already existing trouble, with a temperature ranging from 102 to 104, and a feeble and frequent pulse 100 to 120 per minute.

Three days before his death which took place August 4th, seventy-nine days from the period of incubation, his left knee began to look red, and within ten hours in the center of the circumscribed redness, a large vesicle appeared, which soon became pustular, of a deep yellow hue. The day following its appearance, the pustule seemed to be excavated, with abrupt and ragged edges. Soon the same condition appeared on the bridge of the nose, simulating the one on the knee. At this period, forty-eight hours before death, the eruptions began to form on the arms, legs and body, and passed from the

erythematous blush through the vesicular and pustular stages with great rapidity; the eruption increased more than half in the twenty-four hours prior to his death. The temperature gradually fell to normal or below, forty-eight hours before death, and remained so until death. Twelve hours before death the entire surface became deeply jaundiced. The pneumonia gradually grew worse until the entire lung became hepatized.

During the seventy-nine days of illness neither ulceration or catarrhal indications were perceptible about the nose or throat. Neither were there any farcy buds perceptible unless they were in the various abscesses. No roughness or nodular elevations of the integument.

The treatment from the commencement until his death consisted in stimulants and tonics. Quinine in large doses the first two weeks. Iron, liquor potassæ arsenitis, strychniæ, and whiskey, with plenty of beef tea and milk. The abscesses were opened early and thoroughly syringed with warm water.

Not until the week of his death were we able to learn that he had been with glandered horses. It seemed that before and at the time of his first illness, he had been taking care of two glandered horses which came from the logging camp. We also learned that he began to have fever and pains in his limbs while taking care of them. Not being able to learn anything about the cause of the trouble, and with an entire absence of the catarrhal symptoms, also farcy buds, the disease was treated a portion of the time for pyemia, without being able to assign any cause for my diagnosis, excepting the general symptoms of pyemia.

TRACHEOTOMY.

BY A. E. SPALDING, M. D., LUVERNE.

This case of tracheotomy I report for the reason that it involved a complication I have been unable to find mention of in any work containing an article on this subject. Diphtheria of the most malignant type occurred in the family of Mr. C., consisting of four children. Miss I. C., aged seventeen, was the third one of the members to be afflicted with this terrible disease.

The exudation involved the tonsils and soft palate, but was not thick, nor was there much glandular swelling as in the other members of the family. The case progressed favorably until the ninth day, when she became hoarse, and finally was unable to speak above a whisper. On the eleventh day every attempt at swallowing liquids caused paroxysms of coughing, which increased in severity, and dyspnœa became a constant symptom.

Lime vapor inhalations gave relief for a time, but on the twelfth day, death from asphyxia becoming evident, the parents gave their consent to have tracheotomy performed. At 10 o'clock P. M., with the assistance of Dr. C. A. Palmer (dentist), who administered the ether, I opened the trachea in the usual manner. Long shreds of false membrane immediately escaped, and breathing became easy. I inserted a canula, kept the atmosphere of the room moist, and at a temperature of eighty derees Fahrenheit. The patient passed a comfortable night after the operation, but at every attempt at swallowing nourishment she would have paroxysms of coughing, and I noticed, after several such efforts, that egg-nog, which was lastly given, escaped through the canula, showing non-

closure of the glottis during the act of swallowing. I immediately attached a number twelve gum-elastic catheter to a rubber tube connecting with a small funnel, and after passing the catheter into the stomach, administered the nourishment and stimulants through the tube. The patient said she felt much better after the first dose of brandy and milk given in this manner, and was glad to have it so administered.

The case terminated fatally thirty-six hours after the operation from broncho-pneumonia. While the case might have terminated fatally under any form of treatment, surely the irritation produced by the ingress of fluids to the respiratory organs hastened the fatal termination.

A DECADE OF OBSERVATION AND EXPERIENCE IN ANTISEPTIC SURGERY.

BY JAMES H. DUNN, M. D., MINNEAPOLIS.

It was my fortune to begin the study of my profession on the eve of a wonderful revolution in external medicine. From time immemorial surgeons had noted that wounds sometimes heal without suppuration by so-called "first intention," or under the scab, a course almost uniformly pursued by simple fractures; and the fact that an opening, however insignificant, changed most materially the prognosis in the latter case, naturally led the thoughtful to look upon the access of air or some other foreign substance, to the seat of repair, as the cause of the malign influence of such compound fractures.

Appert had early in this century investigated the methods of preserving animal and vegetable substances by exclusion of air, unpurified by the boiling temperature, which experiments induced Gay Lussac and other natural philosophers to investigate the atmospheric air for the causes of putrefaction. His error of attributing fermentation and decay to the influence of the oxygen of the air was corrected through the labors of many contemporary and subsequent natural scientists, but it was reserved for Schwann to demonstrate that earth, water and air is on every hand inhabited by a world of microscopic cells and organisms which he held to be the active cause of the processes of fermentation and putrefaction. The investigations instigated by the hot disputes over the question of spontaneous generation, pro and con, had enlisted a large number of able workers, and considerably extended our field of knowledge of micro-organisms and of the putrefactive and fermentative process, when Pasteur, in a series of princely experiments, confirmed and varied by Tyndall and a host of others, demonstrated beyond question that putrefaction is not only initiated and continued by micro-organisms almost omnipresent in the air, but that at least some diseases, human and comparative, are caused by certain specific microscopic fungi.

Meanwhile, late in the last and early in this century, such practical men as Abernethy, Sir Charles Bell, Delpech, Brodie, Cooper, Dupuytren, and other master minds, regarded the causes of suppuration to exist in the air and other foreign substances, and advised subcutaneous surgery in opening abscesses, joints, tenotomy, etc., insomuch that this method of operating had become a fixed principle in modern surgery.

In 1867 Lister published the results of an attempt to practically convert compound into simple fractures by cleansing, disinfecting, and closing the external wounds,

his theories being based upon a multitude of ingenious experiments by himself and many others, which had demonstrated in the most beautiful and satisfactory ways that air and other substances and articles may be sterilized by various processes which destroy the infinitesimal germs which they so richly contain.

It may be well to remember that at this time science had demonstrated: *a*. The causes of putrefaction are microscopic germs in earth, water and air, which, gaining entrance to dead organic matter, multiply and thrive upon the carcass until it is consumed, or transformed into other forms of matter; *b*. Certain diseases are known to be due to microscopic fungi—probably most surgical diseases are so caused.

In this state of affairs, while our stock of exact and experimental knowledge of bacteriology was yet most rudimentary but *theories* of the germ origin of disease were luxuriant, the genius of Lister made a bold attempt to bridge, by empirical means, the chasm between demonstrated science and the bright dreams of theory. The results of this attempt are familiar to all surgeons practically conversant with the history of recent surgery. Although medicine, it must be confessed, has throughout its history had to attribute most of its advances to empiricism, never, perhaps, have such magnificent results followed empirical methods at a single bound. The ordinary course of empirical advances is that pounds of more or less hurtful error, which are rejected only after a long and desperate struggle, are advanced with golden grains of truth which are but slowly winnowed from the baneful chaff. Listerism, however unnecessarily complicated, has never been charged with injuriousness. Its worst enemy could but smile complainingly of its prodigality in care and expense. Not one of its essential principles has ever been called in question by scientific

criticism. Ignorance, carelessness, and obstinate bigotry have been its only opponents. Is not this triumph of empiricism due to the fact that Listerism was based upon a strong foundation of demonstrated knowledge—a rational empiricism, if you please?

The revolution which Listerism inaugurated is admitted by all; floods of suppuration have been prevented, years of time in the healing of wounds saved, erysipelas, pyemia, septicæmia, and hospital gangrene stamped out as verily as vaccinia and quarantine have quenched variola. New operations have been fearlessly established in regions and organs hitherto thought beyond the justifiable reach of the surgeon; exploratory incisions and operations upon peritoneum, intestines, chest, brain, bladder, uterus, liver, kidneys, joints, osteotomies for deformities, and what not? And with what results? Everywhere lowered mortality, everywhere less suppuration, everywhere quicker healing, everywhere less drain on the system, less complications, less surgical disease.

Under my preceptors, in 1873 and 1874, I neither saw nor heard anything of antiseptic methods. At Rush Medical College, in 1875 and 1876, mention was made of Lister's method, but nothing more; the dressings observed were of the olden type of ante-bellum days. Erysipelas, pyemia and septicæmia were not infrequent diseases. I saw several young persons operated upon for deformities with lethal results from erysipelas and septicæmia; cases that under present methods of operating and dressing certainly ought not to end fatally.

In New York, in 1877 and 1878, a few were attempting the new methods, but most old operators were pursuing their old ways. Suppuration was quite general in large wounds. Erysipelas and septic infection after wounds was much dreaded, and was a cause of a large percentage of the mortality after operations.

On getting fairly into active practice with cases before me, I found the journals full of discussions, pro and con, and from my imperfect observations in New York and my subsequent readings I soon began to practice as perfect antiseptic precautions as I knew how to, while my colleagues doing surgery, being mostly educated in our greatest school of surgery of a quarter of a century ago, the civil war of the Rebellion, were then, as they are mostly yet to-day, pursuing old methods of dressing wounds. My colleagues did most excellent surgery of the kind, and I saw them achieve some excellent results, but there was much uncertainty about the cases. Suppuration was frequently profuse, and all the infectious surgical diseases occurred now and then. Cases were lost that would not be considered in danger under antiseptic methods of operating and dressing. These cases were isolated and in the pure air of the country, and while the results were often excellent, with remarkably little suppuration in some instances, yet the results were notably uncertain. At times cases disappointed the surgeon by resulting as remarkably bad as others surprised him by the opposite course. Union by first intention in large wounds was regarded a notable exception.

In 1884 and 1885 I visited the great clinics of the Continent, particularly those of Berlin and Vienna, and for the first time saw antiseptic surgery in its full glory under the painstaking scientific Germans. Weeks and months were spent, not in *seeing operations*, but in observing the dressing and progress of wounds with an endless variety and amount of material. The change from the surgery of our old style colleagues to that in vogue in those clinics was the change from haphazard blundering to scientific accuracy. The operators were frequently less dexterous, less brilliant, and superior only in a conscientious and scientific execution of an exact knowledge in the science

of preventing infection of wounds. Since then I have done some surgery and observed a great deal more in the practice of many colleagues otherwise most excellent surgeons, but for the most part those who make little or no attempt at antisepsis. My own results are tabulated below; the results of my observations of the surgery done without adequate antiseptic precautions can only be given in a general way, and by comparison with work observed abroad.

Considerable as this surgery seen during the past two years without strict antiseptic precautions is, it is but a mere bagatelle compared with that which I followed closely in Berlin and Vienna, and I can say that I have seen more erysipelas in Minneapolis than I saw in all the vast clinics and hospitals while abroad. A filthy, extensively suppurating wound I do not remember to have seen in Berlin; in Minnesota I have seen torrents of pus. Pyemia and septicæmia were rarities in those clinics, but I have seen a number of cases since my return. Here, healing by first intention is rare, there far more frequent. Let it be remembered I am not speaking of surgery in general in Minnesota. I am comparing the results of wound treatment with no adequate attention to antiseptic methods—a form of surgery still by far too prevalent in our State—and the result of the strictest antiseptic precautions, the system almost universally in use in Germany. I have seen as excellent antiseptic surgery done in various parts of Minnesota as in any place in the world, but it must be confessed that most of the rough and emergency surgery of the Northwest is still denied the beneficent advantages of the great scientific advances in wound treatment of the past two decades. And it seems to me almost a disgrace that this large, learned and powerful society has not so set its seal of condemnation upon the slovenly and dirty methods by which a vast percentage of the

emergency surgery is still dressed, at a time when science and experience have given us a better light, and when the unfortunate are sacrificed upon altars of the reputations of the men who refuse to believe in what they do not comprehend, and who rest upon laurels won decades ago.

Let me ask you, gentlemen, is it not desirable in every instance, in treating wounds, to reduce suppuration to a minimum? Is not the testimony of the surgical world, at least all that part of it worthy of the credence in scientific circles, unanimous in declaring erysipelas, pyemia, septicæmia and other surgical diseases as preventable maladies? Do not all truly scientific observations throughout the world show conclusively that antiseptic methods of wound treatment have most brilliantly accomplished these results in a degree never before dreamed of by the most sanguine?

Nothing was ever proven beyond the question of a considerable, nay respectable, portion of mankind. Many question vigorously the utility of vaccination, but a scrutiny of the names, however illustrious or respectable, will discover few or no experts whose testimony should be given the least weight in evidence. Apparently sane and so-called educated men still claim the earth to be flat. A member of our profession lectured before the students of the State University to prove this ancient doctrince and to refute the dogma of a mundane spheroid. Yet I need not tell you that he is not much of an astronomer. A few surgeons there are who deny the benefits of antiseptic wound treatment, but they are no more expert judges of the system, nor of the pathology of suppuration and post operative diseases than I am of the most abstruse problems in astronomy. Others deftly cover their peculiar position with the naive remark that perfect cleanliness is all that they find necessary—in their beautiful simplicity not perceiving that the whole aim and end of anti and aseptic

methods is to secure perfect cleanliness, a cleanliness which is only achieved by sterilizing everything which comes in contact with wounds, and provides for preventing putrefaction in wound discharges, and the most perfect devise yet found to this end is the conscientious application of such means as science has shown to prevent suppuration and post operative affections. This is antiseptic wound treatment. No one has offered a scintilla of evidence to disprove a single essential principle upon which antiseptic surgery is based. The question for the future is simply as to how these principles are best carried into practice in a given case. No one has disproven that antiseptic methods when skillfully and in all details have been applied, have been more or less effective in destroying and neutralizing the activity of septic germs. It can only be retorted that they are not always effective.

The strongest case that the objectors to antiseptic surgery have been able to make out, is that such wonderfully successful operators as Tait have achieved their most glorious results without it, and are in fact said to be open opponents of the system. Here again is reasoning of men who persist in living considerably behind the science of their time, and who wholly fail to grasp the principles of a system which deals with organisms too subtle for their coarse methods of investigation and reasoning.

So far as I know Tait's record is based wholly upon abdominal sections, and while Mr. Tait is perhaps the greatest surgeon of the day and very wise in some things, like most of us he is colossally ignorant in others, and appears to be lacking in that modesty which is wont to accompany wisdom of the highest type. Senger has shown up Mr. Tait's ignorance in recent pathology in a most vivid manner, and while the great laparotomist has shown himself to be a consummate artist in his branch, he is neither a shining example of modesty nor a distin-

guished pathologist. Nor does his reasoning that he having achieved the greatest success in abdominal surgery without Listerism, prove antiseptic wound treatment in general to be a humbug. But it is idle to discuss and debate. Antiseptic surgery is a fact. Is an advance that lives and will live, and further investigation will teach much as to the best means of carrying its principles into effect without robbing it of its well merited glories.

But what light has the vast amount of experimental research of the past decade thrown upon the subject?

a. Not only is putrefaction and fermentation proven to be due to microscopic fungi, but suppuration (to all intents and purposes) has been demonstrated to be due to the entrance of micro-organisms to wounds, and to their action solely. We are surrounded by minute forms of life, and as soon as the vitality of cells is lessened by traumatism or other causes, they are attacked, overpowered and succumb.

b. Many more diseases are proven to be due to specific micro-organisms, and this is especially true of the so-called traumatic diseases, as erysipelas, pyemia, septicæmia, etc.

As destroyers of these germs, corrosive sublimate retains the highest place, but carbolic acid and iodiform are yet indispensible.

It is true that the ingenious experiments of Councilman show that other irritants than micro-organisms may cause suppuration, but the whole tenor of modern investigation shows that practically to the surgeon suppuration is instituted and kept up by the access of swarms of organisms to the wound, and that specific surgical diseases are all due to the entrance of specific varieties of fungoid life.

Antiseptic surgery in its broadest sense, consists in surrounding the wounded organism with every opportu-

nity for its healthy existence and every means, not fatal to the higher life, which is unfavorable to the luxuriant growth of these micro-organisms. It matters not whether this be by good air and food to nourish the wounded, the prevention of shock which lowers vitality, germicides to destroy germs, gauze or other porous substances to absorb discharges and prevent their putrefaction, rest by infrequent dressings, drainage to remove fluids likely to become a grand culture fluid for micro-organisms, methods of operation calculated to favor rapid union, or what not. And thus it is why rapidly manufactured surgeons and men lacking the broadest scientific culture or wanting in love of details never become true antiseptic surgeons, although they may become men of gauze and germicides.

It has further taught us that no method has yet been found by which wounds may be absolutely sterilized, and that the tissues themselves are to a certain limited extent, capable of dealing successfully with these antagonistic micro-organisms under proper circumstances, when the invaders do not attack the system in overwhelming myriads or whit specially virulent species. Thus all antisepsis and asepsis is only proximate. Antiseptics too, like all other drugs, are necessary evils, and could a place be found with perfectly sterile atmosphere, and surgeons with chemically pure hands and instruments, antiseptic precautions would not be necessary. It is true that some localities are far purer than others, especially from the more malignant and specific varieties of micro-organisms, but none are so pure as to wholly prevent accidents. Antiseptic treatment is more necessary in crowded hospitals and cities than in the pure air of country houses of good hygienic appointments, but accuracy and uniformity of results, even under best of surroundings, is only secured by antiseptic methods.

Experimental science having done so much for the justi-

fication of antiseptic surgery by demonstrating the causative relation of micro-organisms to suppuration and traumatic diseases, will probably in the future further the success of wound treatment mainly by teaching us of the conditions under which micro-organisms flourish most luxuriantly. "Grawitz, Stat. und Exper. Path. Beitrag zur Kentniss der Peritonitis," furnishes many valuable surgical lessons in a study of the mode of action of micro-organisms in peritonitis. "The introduction into the healthy peritoneal cavity of rabbits, of the ordinary forms of micro-organisms (even in large quantity) of the same, together with putrescible albuminous substances (spleen-pulp) of cholera-bacilli, and even of fecal matter—produced no peritonitis, if the quantity was not greater than the peritoneum could absorb or safely encapsule in a limited time—about one hour. When the absorptive power of the peritoneum had been impaired, the same agents were more slowly absorbed, but produced no peritonitis, although septicæmia resulted if the micro-organisms had the power of decomposing albumen. Pure cultures of micro-organisms capable of producing suppuration, provided the injected fluid was not chemically irritating and not too great in amount (not much over 10 ccm.), produced no inflammation in a normal peritoneum. But they did produce suppurative peritonitis under the following conditions:

(*a*) When stagnant fluid was present, capable of nourishing the micro-organisms (salt-solution, bouillon,) the bacteria developing more rapidly than the peritoneum could absorb them.

(*b*) When caustic solutions had prepared a field for the growth of the micro-organisms by destroying the surface of the peritoneum.

(*c*) Especially when a wound of the peritoneum was present—even the hypodermic puncture made in intro-

ducing the cultures may be the starting point of peritonitis.

These, and many other valuable experiments of the past few years, indicate that antiseptic operation and dressing of wounds will, in the more perfect knowledge of the future, consist *not less in antagonizing the multiplication of organisms by means derived from a more perfect knowledge of the requirements for the luxuriant growth and highly intensified virulence of organic germs, than by the use of poisons for their destruction.* Whether we shall ever acquire knowledge of this character sufficient to enable us to dispense with germicide drugs remains to be seen. At this date they are, properly used, indispensable to the best results.

At present, in the words of my worthy colleague Dr. Franklin Staples, who, having grown old in the practice of surgery and educated—I had better said graduated—before the days of antiseptic surgery, and who, as is known to every member of this Society, keeps abreast of all real progress, "I believe that antiseptic surgery means, not only perfect cleanliness in all the details of work, but something more."

TABULATED REVIEW

Of Sixty-One Consecutive Cases of Capital Operations and Injuries, treated according to the Principles of Antiseptic Wound Treatment.

HEAD.

No., Name, Age and Sex.	Condition before Operation.	Operation.	Course after Operation.	Result.
1. W. S., 12. M.	Comp. frac. in upper anterior corner of parietal bone with depression.	Trephining.	No elevation of temperaature. No suppuration.	Recovery.
2. J. N., 18. M.	Extensive comp. frac. of both parietal and occipital bones, with loss of brain substance.	Crucial incisions four and five inches long. Removal of a large area of comminuted and depressed skull.	No fever, no untoward symptoms; scalp healed throughout *per priam* under first dressing. No suppuration.	Recovery.
3. J. T., 25. M.	Comp. com. fract., with depression.	Trephining and elevation of depressed bone.	Slight suppuration and transient fever.	Recovery.
4. M. G., 13. M.	Comp. com. fract., with depression.	Trephining and elevation of depressed bone.	Slight suppuration; no bad symptoms.	Recovery.

5. W. G., 40. M.	Comp. com. fract., with depression.	Trephining and elevation of depressed bone.	No fever; slight suppuration. Scalp healed by granulation.	Recovery.
6. G. S., 31. M.	Epilepsy from old depression from fracture ten years previous.	Trephining.	No bad symptoms. No suppuration worth mentioning; no fever.	No return of disease during next three months. Not heard from since.
7. G. G., 58. M.	Head crushed in by several blows of an ax. Fragments driven two inches into brain. Much loss of brain substance.	Thorough cleansing. Free opening. Removal of fragments and Lister dressings.	Temperature 101. No suppuration.	Never regained consciousness. Died on the 8th day.

TRUNK.

8. Mrs. L., 42.	Cyst of Broad Ligament. Abdomen the size of a pregnant woman at full term.	Removal by laparotomy.	Union by first intention. No suppuration.	Recovery.
9. Mrs. L., 46.	Ovarian cyst.	Ovariotomy.	No suppuration. Highest temperature 101.	Recovery.
10. Mrs. F., 35.	Ovarian cyst.	Ovariotomy.	No suppuration. Highest temperature 100.	Recovery.

TABULATED REVIEW—*Continued.*

TRUNK—*Continued.*

No., Name, Age and Sex.	Condition before Operation.	Operation.	Course after Operation.	Result.
11. Mrs. A. A., 50.	Pyonephrosis, complicated with acute general peritonitis.	Exploratory laparotomy, incision and drainage of kidney.	Wound did well.	Death from peritonitis far advanced before operation.
12. Mrs. M. M., 52.	Strangulated femoral hernia.	Herniotomy.	No elevation of temperature. No suppuration.	Recovery.
13. S. T., 34. M.	Strangulated inguinal hernia.	Herniotomy.	No elevation of temperature. No suppuration.	Recovery.
14. J. G., 23. M.	Strangulated inguinal hernia.	Herniotomy.	No elevation of temperature. No suppuration.	Recovery.
15. Mrs. J. C., 60.	Strangulated femoral hernia.	Herniotomy.	No elevation of temperature. No suppuration.	Recovery.
16. J. T., 45. M.	Double inguinal hernia.	Radical cure by cutting down on sack, ligating, cutting it off and stitching pillars.	No elevation of temperature. No suppuration.	Operation failed to cure either hernia.

17. W. S., 28. M.	Inguinal hernia.	Radical cure by cutting down on sack, ligating, cutting it off and stitching pillars.	No elevation of temperature. No suppuration.	Apparent cure for nine months.
18. Mrs. F., 40.	Carcinoma of breast.	Amputation.	Highest temperature 100. Healed without suppuration except small sinus.	Recovery.
19. Mrs. C., 48.	Carcinoma of breast.	Amputation and excision of enlarged axillary glands.	Highest temperature 101. Healed almost absolutely without suppuration.	Recovery.
20. A. C., 32. M.	Carcinoma testis.	Castration.	No rise of temperature. Healed by granulation with slight suppuration	Recovery.
21. P. V., 35. M.	Sarcoma testis.	Castration.	No rise of temperature. Primary union.	Recovery.
22. W. K., 45. M.	Carcinoma testis.	Castration.	No rise of temperature. Primary union.	Recovery.
23. J. E., 60. M.	Large lipoma of back.	Excision.	No fever. Slight suppuration.	Recovery.

TABULATED REVIEW—*Continued.*

TRUNK—*Continued.*

No., Name, Age and Sex.	Condition before Operation.	Operation.	Course after Operation.	Result.
24. Mrs. L., 38.	Lipoma of shoulder.	Excision.	No symptoms. Not more than a teaspoonful of pus.	Recovery.
25. Mrs. S., 30.	Cystic goitre size of a child's head.	Tapping and injection with pure tincture of iodine.	Severe symptoms of iodism.	Complete recovery and no return of goitre.
26. Mrs. McH., 40.	Sarcoma of neck size of a goose-egg.	Enucleation.	No fever. No suppuration except about stitches allowed to remain too long.	Recovery.
27. O. O., 32. M.	Obscure bladder trouble of about 10 years standing. Death apparently impending if not relieved.	Digital exploration of bladder by median perineal incision. Ulcer at base of bladder discovered size of a copper cent.	No fever. Condition wonderfully improved by irrigation of bladder with nitrate of silver solution.	Great improvement. Still under treatment.
28. J. DeM., 68. M.	Stricture of deep urethra. Enlarged prostate. Dilated bladder.	External perineal urethrotomy and drainage of bladder.	No bad symptoms.	Much relieved.

UPPER EXTREMITY.

29. Miss D., 16.	Gangrene from fracture of the forearm.	Amputation of arm above the elbow.	Healed by first intention except about half an inch which discharged slightly. Highest temperature 101.	Recovery.
30. A. S., 65. M.	Whole upper extremity crushed in machinery. Great bruising of body.	Amputation at shoulder joint.	Did not rally from shock.	Death on third day.
31. C. H., 12. M.	Comp. com. fract. of arm with laceration of the brachial nerves and vessels.	Amputation at shoulder joint.	Highest temperature 102. Healed practically by first intention.	Recovery.
32. H. P., 21. M.	Fracture of radius. Tight bandaging. Gangrenous to near the shoulder.	Amputation at surgical neck of humerus.	Highest temp. 102½. Healed by granulation with very moderate suppuration.	Recovery.
33. Mrs. B., 50.	Sarcoma of hand.	Amputation of forearm in lower third.	Healed almost entirely under first dressing. No fever.	Recovery.
34. M. S., 16. M.	Comp. com. fracture of elbow joint.	Resection of two and a half inches of lower end of humerus.	There was extensive loss of soft parts which filled up rapidly with granulations and healed complete under 4 dressings.	Recovery. Exceedingly useful arm with which he does nearly all kinds of farm work.

TABULATED REVIEW—*Continued.*

UPPER EXTREMITY—*Continued.*

No., Name, Age and Sex.	Condition before Operation.	Operation.	Course after Operation.	Result.
35. W. P., 32. M.	Hand crushed in coupling cars.	Amputation at the wrist joint.	Slight suppuration. No elevation of tempera're	Recovery.
36. M. R., 30. M.	Comp. frac. of humerus at junction of the upper with middle third.	Cleansing, antiseptic dressing and plaster splint.	Temperature 101. No suppuration.	Recovery.
37. L. R., 5. M.	Caries of the lower end of the ulna.	Resection of the end of ulna.	Healed by granulation. Moderate suppuration. No febrile reaction.	Apparent recovery. Return of disease in wrist joint 6 months later.
38. L. R., 6. M.	Extensive caries of the lower end of radius and carpal bones.	Resection of the wrist joint.	Highest temp. 101 on second day. Moderate suppuration. Filled up rapidly with granulations.	Recovery with prospect of a useful hand. Not yet discharged.
39. J. G., 35. M.	Comp. com. fracture of forearm.	Cleansing and Lister dressing.	No fever. Flesh wound healed rapidly under crust of dried blood.	Recovery. Very excellent results.
40. A. R., 46. M.	Traumatic aneurism of radial artery.	Opened up and turned out clots and ligated both ends of artery.	No fever. No suppuration.	Cured.

41. H. H., 36. M.	Palm of hand perforated with pistol ball.	Cleansed. Antiseptic dressing.	Slight suppuration.	Rapid and complete recovery.
42. J. W., 18. M.	Loose cartilage of elbow joint.	Removal by incision.	No fever. No suppuration.	Recovery of joint perfect.
		LOWER EXTREMITY.		
43. A. J., 16. M.	Caries of femur.	Amputation at hip-joint.	Highest temp. 101½. Healed mainly by direct union. Very little suppuration.	Recovery.
44. J. R., 32. M.	Tubercular disease of knee-joint.	Amputation six inches above knee.	No fever. Healed by first intention throughout.	Recovered from operation. Recurrence of disease in hip and lungs and death 1½ years later
45. A. B., 58. M.	Leg crushed by carwheel.	Amputation at middle of thigh.	Delirium traumaticum. Had been a hard drinker. No suppuration. No attempt at repair.	Death on second day, of exhaustion and shock.
46. T. J., 21. M.	Ankle crushed in machinery.	Amputation of leg at junction of the lower with the middle third.	No fever. Very slight suppuration.	Recovery.
47. E. B., 15. M.	Fungus disease of knee-joint.	Amputation above the knee.	No appreciable rise of temperature. Healed under first dressing except at exit of drains.	Recovery.

TABULATED REVIEW—*Continued.*

LOWER EXTREMITY—*Continued.*

No., Name, Age and Sex.	Condition before Operation.	Operation.	Course after Operation.	Result.
48. J. F., 6. F.	Necrosis of tibia.	Removal of shaft of tibia almost entire.	Filled rapidly with healthy granulations. Moderate suppuration, little or no fever.	Recovery.
49. E. S., 10. M.	Punctured wound of knee-joint.	Cleansing, antiseptic dressing, and fixation.	No fever. No suppuration.	Perfect recovery of joint.
50. J. L., 22. M.	Incised wound of knee-joint.	Cleansing, antiseptic dressing, and fixation.	No fever. No suppuration.	Perfect recovery of joint.
51. M. K., 18. M.	Incised wound of knee-joint.	Cleansing, antiseptic dressing, and fixation.	No fever and no suppuration.	Perfect recovery of joint.
52. A. G., 56. M.	False joint from fracture of leg in middle third.	Resection of ends of bones, wiring, fixation, and antiseptic dressing	Slight and transient fever, little suppuration.	Recovery. Useful limb.
53. F. M., 14. M.	Morbus coxarius, with fistulous opening.	Resection of head of femur.	No fever. Healed by granulation with slight suppuration.	Recovery. Useful limb.

54. J. W., 16. M.	Caries of tibia.	Sequestrotomy.	No fever.	Recovery.
55. T. F., 31. M.	Comp. fracture of leg. Comminuted frac. into knee-joint. Tetanus on second day.	Amputation above knee ten hours after tetanus began.	Tetanus increased in severity.	Death in twenty-four hours of tetanus.
56. N. T., 15. M.	Incised wound of ankle-joint.	Cleansed. Lister dressing applied. Rest.	No rise of temperature. No suppuration.	Perfect recovery.
57. M. H., 22. M.	Incised wound of ankle-joint.	Cleansed. Lister dressing applied. Rest.	No rise of temperature. No suppuration.	Perfect recovery.
58. H. J., 45. M.	Compound fracture of leg.	Cleansed, antiseptic dressing and plaster splint.	No rise of temperature. No suppuration.	Good recovery.
59. R. R. M.	Compound fracture of leg.	Cleansed, antiseptic dressing and plaster splint.	No rise of temperature. No suppuration.	Good recovery.
60. J. R., 27. M.	Shot-gun wound of arch of foot.	Excision of internal and middle cuneiform bones and part of scaphoid.	Filled rapidly with granulations, with very moderate suppuration.	Recovery with good foot, slightly weak.
61. V. R., 35. M.	Popliteal aneurism.	Ligation of femoral artery.	No rise of temperature. No suppuration.	Recovery.

There were then sixty-one operations and injuries, with five deaths, none of which could fairly be attributed to the operations performed. Not a single case of erysipelas, pyæmia or septicæmia, and not a single foul wound with excessive suppuration. In the majority of the wounds, of course, at one stage or another, there has been some slight suppuration, but most of the large wounds have healed throughout, all but an insignificant part of their extent under a single or at the most the second dressing, without more than a trace of pus and with the dressings still free from the slightest odor of putrefaction. I have seen enough of non-antiseptic surgery in able hands to know that it does not give such results. It is but fair for me to state that while this list contains but the major operations and injuries treated during this time, it includes every fatal case in which I have ever operated, excepting only two fatal tracheotomies for diphtheria, and that I have never had in other wounds treated antiseptically, a case of pyæmia, septicæmia or erysipelas.

For obvious reasons I have not included operations about the mouth, anus, vagina, urethra, tracheotomies for diphtheria, and minor surgical operations,—first, because they are less susceptible to perfect antisepsis, and second, it would unnecessarily prolong the list with a large number of minor operations which would be less convincing or useful, as markedly bad results are not strikingly frequent under non-antiseptic precautions, yet in all these operations I attempt to carry out antisepsis as fully as possible and with very gratifying results.

Seven cases of trephining, six for compound comminuted fracture of skull and one for disease, with one death, which was inevitable from the extent of injuries. While these injuries to the skull were most of them extensive, cases one and three were not marked by very great depression, and in no case were symptoms of compression waited for, as I have always acted upon the principle

that compound comminuted fractures of the skull should be most carefully explored at once and loose fragments of bone sufficiently removed to render the wound aseptic. I have had no reason to regret this course, as the results have been very remarkable.

Wagoner of Konigshutte recently published a series of ninety-five (95) cases of compound fractures of the skull, treated in the hospital for coal miners of that place during the past nine years, by strict antiseptic methods. About six-sevenths of the number were brought into the hospital at once and subjected to careful cleansing and removal of loose bone, &c. Of these the death ratio was 1.23 per cent., the remaining one-seventh did not apply for admission for at least twenty-four hours. In this group the mortality averaged 33⅓ per cent. Infection of injuries of the periosteum and bones lead to rapid dissemination of infective material, by means of the veins of the diploe, to the brain and its tissues, or lead to pyæmic metastases.

Of the four laparotomies the one death can certainly be in no way attributed to the operation, and the post-mortem together with the appearance of the abdomen at the exploration showed the death to be in no way dependent upon surgical interference.

In abdominal surgery I believe all antiseptic precautions should be most minutely carried out in order to render patient, room, surroundings, hands, instruments, dressings as nearly aseptic as possible. But with the more recent investigations it seems questionable whether it is ordinarily advisable to introduce antiseptic substances into the abdominal cavity. If all objects entering the cavity, except the air, be sterilized, the peritoneum under proper circumstances is amply capable of dealing with the germs of air as pure as that of a room fit for such an operation. Hence in my operations I have used antiseptics most liberally for cleansing room, (fumigating with sulphur and scrubbing with sublimate solution,) scrubbing

and bathing abdomen, cleansing hands and instruments, sterilizing sponges, &c., &c., but everything that has entered the abdomen has first been rinsed in distilled water to remove irritating antiseptics.

The wound, too, being small, and if properly stitched the peritoneum uniting again and resealing the cavity in the course of a few hours, frequently renders the need of perfect antiseptic dressings less marked than in other wounds. An uncomplicated ovariotomy, it seems to me, above all operations requires simply asepsis and perfection of technique; few grave operations present less needs for extensive use of antiseptic drugs, and their excessive use may not only be useless but injurious.

Of six hernia operations none were fatal or gave rise to any untoward symptoms. The attempts at radical cures were failures.

Of the two breast amputations one died in one year probably from cancer of the stomach.

Twelve major amputations with three deaths, considering the severe injuries and circumstances, is not a high mortality. One death occurred in an old man of sixty-five, one in a hard drinker of advanced age, and one of tetanus already well advanced before the operation. The six resections without untoward symptoms is simply a confirmation, on a small scale, of the wonderful utility of antiseptic precautions in a great class of conservative operations mainly dangerous from liability to wound infection.

Five openings of the three great joints of the body, elbow, knee and ankle, without accident, is also proof of the utility of antisepsis.

Four compound fractures without fever or suppuration is, I think, far better than can be expected under non-antiseptic treatment.

In conclusion I almost feel that an apology is due for considering at this late day the subject of antiseptic

wound treatment, when to scientific surgeons there is but one side to the question. My excuse is solely that so large a percentage of general surgery is still denied the benefits of this great advance of the past two decades.

OBSERVATIONS ON THE SURGICAL TREATMENT OF RECTAL DISEASES.

BY W. W. & W. J. MAYO, M.D., ROCHESTER.

The experience of physicians in private practice, in this as in other departments of practical work, is of interest on account of various modifications of ordinary operations, made not because they differ from hospital patients in pathological conditions, but required from the facts that the patients are more independent, expect to pay, and frequently have prejudices for or against certain procedures which may be erroneous, but are none the less firmly held and insisted upon.

The requirements to meet are: 1. That the cure shall be permanent with the least pain possible; 2. That the time lost from business shall be reduced to a minimum.

During the last eighteen months we have tried the various methods of treatment and will attempt to demonstrate which has been most successful and satisfactory, considered from the point of the patient as well as the physician.

We have not found specula, as a means of diagnosis and treatment, of general use, and seldom make a diagnosis with one which we fail to make digitally. With scarcely

an exception the bi- and tri-valve specula partially obscure the lower one and one-half inches of the rectum, wherein most of our work must be done. Their use is often painful and frequently alarms the patient unnecessarily, so that, unless required by peculiarities of the case, we do not make routine use of them. Our preference is for the retractor, made on the principle of Sims' vaginal speculum. A cylindrical speculum which allows a view of the rectal walls as it is gradually withdrawn is often of service; and the Allingham plug speculum also has its value in proper cases.

The use of means to relieve pain is an important problem. In operations requiring much time, ether is always used; cocaine applied externally has little effect. The pain of hypodermic injection is complained of unless the needle be very fine, and in this locality the drug appears to frequently cause faintness. It is of the most benefit in the incision or excision of external piles. In the majority of these minor operations it is our custom to give our patient a couple of ounces of slightly diluted brandy, the reflex action in a temperate person being sufficient to benumb sensibility for a short time.

In the treatment of external hemorrhoids, when not inflamed and consisting of tag-like tumors, we have found their removal with scissors most satisfactory. If inflamed and containing a clot it is incised, and after contraction has taken place the remaining tags are excised. In the large œdematous or doughy tumors, covered entirely or nearly so with skin, and varying in size from a hazelnut to a walnut, the hypodermic injection of a few drops of a 50% solution of carbolic acid crystals into the center of each pile will generally cause a rapid shrinkage in the course of a fortnight, and by removing the remains with scissors the cure is made permanent.

Herein may lie the cause of the more frequent return of hemorrhoids after injection than by removal by other

methods. Unless sufficient acid is used to cause the entire removal by slough, the remaining tag (in both internal and external piles) is the point of least resistance to those bodily habits which are active in their production.

Internal hemorrhoids treated indiscriminately by the injection method, in our hands at least, has not proved satisfactory, and frequent bad after-results, as sloughing, pain and delayed resolution, soon taught us to select our cases. We now limit its use to the least vascular of the hemorrhoidal tumors. As a rule the ligature is most satisfactory and least painful, though frequently a cause of vesical irritability.

To those cases presenting the small red, wartlike piles, which though in size are insignificant in effect are the cause of much suffering, the application of fuming nitric acid is of immediate relief. The usual history of prolapse with stool, or bleeding, in these cases is absent, and the proper diagnosis and treatment depends almost entirely upon digital exploration and the careful use of the speculum, which is absolutely necessary in the treatment. The ligature is difficult of application, as the tumor is too small to be protruded by straining, and on account of its thin covering and vascular nature will tear and obscure the field with blood if an attempt is made to pull it down. In these cases of all others has injection proved disastrous, causing intense turgescence and inflammation of the neighboring veins and tissues, and frequently setting up a difficulty from which the patient will not recover in weeks. The larger tumors of this variety should be thoroughly crushed with heavy forceps and nitric acid applied to the stumps.

Many of these tumors, if thoroughly crushed and twisted, require no further treatment, while a minimum amount of discomfort is experienced afterward.

The after treatment of the majority of cases consists in the production, daily, of softened fecal evacuations. Equal

parts of sulphur, calcined magnesia and sugar is the laxative ordinarily employed for this purpose; this is given in tablespoonful doses in milk at bedtime. When several large tumors have been ligated, which would prolapse with stool, the constipation plan is necessary, and when desirable to unload the bowels, if an enema of two ounces of sweet oil be given some hours before the laxative the hemorrhoids will be readily ejected. If irritability of the bladder or rectal tenesmus follows operation, hot sitz baths with suppositories of opium and belladonna are efficacious.

A word in regard to stretching the anus. A few years ago it was recommended in almost all rectal diseases. As routine treatment it is barbarous, but if there is spasmodic contraction of the anal muscles, with or without fissure or hemorrhoids, this of itself may cure, if thoroughly performed by grasping the tuberosity of the ischium of each side with the fingers and stretching with the thumbs until muscular resistance ceases so completely that power of contraction is not regained for some days. We have met with a few cases of obstinate dysenteric discharges from the rectum, caused by small ulcerations in its lower portions. The application of nitric acid was quickly followed by a cure.

We have been so well satisfied in treating fistula by incision and packing iodoform gauze that we have tried no other plan. In a recent case of supposed fistula, with the external opening in the median line posteriorly, no internal opening could be found. On careful exploration it proved to be a sinus leading to a suppurating dermoid cyst, containing a bunch of hair several inches in length. Posterior linear rectotomy was performed in one case for stricture and fistula, the incision extending from the internal sphincter to the coccyx. This incision did not heal as expected, it being impossible to keep the patient quiet, and eventually cicatrized without union. It was intended

to freshen the surfaces and suture after the method for complete laceration of the perineum, but as the internal sphincter was capable of retaining feces the patient was little inconvenienced, and, as he was relieved of his former difficulty, he objected to the operation and it was not undertaken.

We have operated upon three cases of cancer of the rectum. The first, an epithelioma involving the tissues of the anus, was excised with a portion of the rectum. There was return of the disease in a few months. The second was too high for accurate location, and caused complete obstruction. An artificial anus was formed by lumbar colotomy and gave much comfort during the remainder of life. The third consisted of a scirrhus the size of an orange, located two inches above the anus on the posterior rectal wall. Knott's vaginal speculum was introduced into the rectum in such a manner as to cause the growth to project between the smaller valves. The tumor was then thoroughly scooped out with the sharp spoon. Great relief was given from the pain on defecation and the irritating discharges for several months. This relief would have been more prolonged by colotomy, and in a similar case, where total extirpation is out of the question, we would give preference to this operation.

Before closing this paper we wish to add a short study of that common and most provoking malady (both to the physian and patient) itching anus.

In our experience the cause of the majority of cases is an irritating discharge from the rectum, and permanent relief depends upon the cure of this condition. We have often found this to be a rectal catarrh from an ulcer, ascarides or an undiscovered internal hemorrhoid of itself causing no annoyance; but in many cases no cause can be found, or the cure of a supposed cause does not relieve. In a chronic case the appearance is typical, the skin is of a light color, greatly thickened and corrugated, the folds

extending into the anus and the bottom of each sulcus fissured or ulcerated. These cases are usually benefited by the following plan of treatment: The skin is put upon the stretch and nitric acid is applied to the ulcerated furrows. To prevent scratching at night a mixture of oil of peppermint one part and olive oil two parts is applied upon a pledget of cotton; or in place of this, extract of belladonna may be smeared over the surface and a drachm of vaseline pushed into the rectum.

Should this fail, a hot hip bath is ordered at bedtime and a lotion of corrosive sublimate or Goulard's liquor applied; occasionally a grain of cyanide of potassium to an ounce of vaseline has a remarkable effect. Should the catarrhal discharge from the rectum be excessive, a suppository of iodoform and tannin may be introduced to render the discharge more bland. In all cases enough of the sulphur and magnesia mixture is given to insure a soft stool.

GANGRENOUS ERYSIPELAS OF THE SCROTUM AND PENIS.

BY J. E. FINCH, M. D., HASTINGS.

T. H., aged 63; English by birth, but had been a resident of this city since 1855; habits good, and general health excellent. Sixteen years ago I had successfully operated on him, injecting port wine, for the radical cure of a hydrocele of the left tunica vaginalis. A few years thereafter a hydrocele developed on the right side, for the

transient relief of which he had been tapped many times, always finding an excuse for not submitting to treatment for its radical cure.

On March 12th, 1886, while on his way home from Fargo, Dak., his scrotum was tapped by a surgeon in St. Paul for the last time, and he arrived at Hastings on the afternoon of the same day. Towards evening of the following day he was attacked with a severe chill while walking on the street, and on arriving at his house and examining his scrotum, which was now becoming painful, he found it considerably swollen, very red and excessively tender.

His experience with previous operations naturally caused him to apprehend no danger, and, consequently, no physician was called until the morning of the 15th, when I was requested to visit him. Found him in high fever and suffering intense pain. The scrotum and penis were immensely swollen and of a very dark red color. He said the surgeon had introduced the trocar and canula at three different points before reaching the effusion. At first I supposed the testicle had been injured by the instrument, but the rapid advance of the disease soon suggested a different and more formidable cause. Already adynamic symptoms were apparent that unmistakably pointed to septicæmia.

Fifteen years before I had treated a case—the only one of the kind encountered in a practice of upwards of thirty years—in which a young man recovered, after losing by sloughing the entire scrotum down to the external spermatic fascia, and the penis down to the fibrous investment of the corpora cavernosa. The parts were freely incised in that case, but all local treatment seemed worse than useless.

Recalling that experience and the case mentioned by M. Trousseau in which a man lost his life, in the wards of that distinguished surgeon, M. Nelaton, by gangrenous

erysipelas following a trifling incision in the frenum of the prepuce, I could not doubt of the formidable character of the case in hand.

My patient was at once put upon the treatment of iron chloride, quinine, brandy, milk and beef tea, all in the fullest doses, and, when the heart began to flag, nux vomica and ammonia were added; but in spite of my best directed efforts my patient sank within forty-eight hours from my first visit. From the commencement of treatment the local disease showed no disposition to spread beyond the parts already affected, and these contined apparently in a state bordering on gangrene without any show of sloughing.

Autopsy twenty hours after death by Drs. A. M. Adsit and J. C. Fitch. The integument, dartos and subdartos areolar tissue were in a semi-gangrenous state, infiltrated with a yellowish semi-opaque serum; the left testicle slightly atrophied; the tunica vaginalis reflexa and its fascial coverings, instead of being adherent to the testicle as I expected, were transformed into a thick cartilaginous tissue. The right testicle and tunica vaginalis were entirely normal. The latter contained about an ounce of clear, perfectly transparent serum. No mark or indication that this membrane had been injured or punctured by a trocar could be found, nor did the most careful inspection of the integument reveal any wound or evidence that the scrotum had been tapped at all, although, as stated *supra*, the patient affirmed that the trocar and canula were introduced three separate times. I am inclined to think, however, that the patient mistook the aspirator for the trocar and canula.

That these cases represent a species *sui generis*, differing essentially not only from medical erysipelas of the face and scalp but also from gangrenous or traumatic erysipelas of other parts of the body, I cannot doubt.

There seems reason to believe that one of my cases, the

latter, was traumatic, while the other was medical. But why should the disease confine itself to the scrotum and penis, unless there be something in its etiology that determines this selection. It is true that facial erysipelas does not generally spread from the face and hairy scalp, but these parts are exposed to the air, which may have an influence in producing this phenomenon; but in the other case there seems to be no reason except some special affinity between the parts involved.

But perhaps the most interesting as well as the most important question connected with these cases, especially the latter case, relates to the origin of the disease. Was the infection communicated by the instrument employed in tapping the scrotum, or did the slight wound produced by the operation, like the slight incision in M. Nelaton's case, simply serve as a starting point for an external poison? I confess my own opinion is that the former theory is the correct one; and, even in Nelaton's case, we have no proof that the knife did not communicate the poison. In these days of antiseptics and of sterilizing agents and processes, such an accident should not happen.

Surgeons cannot be too careful in sterilizing instruments, especially such instruments as aspirator and trocar and canula, before attempting an operation.

As already hinted, it has not fallen to my lot to encounter more than the two cases of this formidable complaint, but I have no desire to repeat the experience.

AN EXTREME CASE OF CONGENITAL CLUB FOOT TREATED BY OSTEOTOMY.

BY H. B. WEIPER, M. D., DURAND, WISCONSIN.

The eight months old boy, W. P., was brought to my office in May, 1886, affected with real congenital club foot of either foot. The heels were drawn up, the soles appeared contracted with a deep furrow across them. The disease was very prominent from bulging outward of the abnormally developed tarsal bones, and the feet turned inwards so that by a little pressure the inner margin of the soles could be brought in contact with the inner side of the leg. The child was otherwise in perfect health and well developed.

The malformation of the tarsal bones was so great, that by using reasonable manual pressure against the direction of the deformity, the feet could only be brought towards the natural position about one-eighth part; the tendons on contracted side were not rendered tense by the pressure, proving that tenotomy could be of no service (except for the tendo achillis), and that resection of the opposing deformed tarsal bones would be the proper treatment.

Dr. F. H. Milligan from Wabasha, myself and another local practitioner assisting, after the patient was anæsthetized, and the circulation controlled completely by a small Esmarch bandage, a piece of the tarsal tissue was removed regardless of the articulations. The tarsal bones were only ossified to such a slight degree, that they could be easily divided with a scalpel, and the operation was absolutely bloodless.

The incision was commenced a little inside of the median dorsal line, and carried outward a little in front of Chopart's articulation to near the external margin of sole.

The tissue removed was wedged-shape about one inch deep, five-eighths of an inch wide and of an elliptical form which corresponded with the surface of the foot. It was now found that the foot could be brought into a natural position. A silver wire was then introduced deep through the tarsal bones, and after washing out the wound with sublimate sol. (1 to 3000), it was brought together well. A few silk sutures were then introduced; iodoform sprinkled over the wound; then borated cotton laid over this, and a splint and bandage applied to keep the feet in their new position.

The healing in one foot was immediate, not a drop of suppuration occurred; in the other some suppuration occurred. There was a disposition of the feet to turn inwards, which was soon remedied by Tilman's club foot shoes for talipes varus.

The latest report from the boy is that he is walking now as well as any child of his age.

A CASE OF ANEURISM OF THE CŒLIAC AXIS

BY P. A. HEITZ, M. D., ST. PAUL.

A man aged 38, who had been ailing for several years, on November last was seized with extreme prostration and pain in the stomach, radiating to the lumbar region. The physician who was called to see him detected a pulsating tumor in the epigastrium. Palpation, percussion and auscultation of the chest gave negative results, with the exception of slight exageration of the second sound at the origin of the aorta. The pulse was from 70 to 80, intermittent. In the epigastric region was a projecting tumor, which became insensibly confounded with the neighboring parts. There was no change of color in the

skin. The tumor was about three inches in diameter and nine and a half in circumference. There were heard over it a murmur synchronous with the arterial diastole, and also one coincident with the respiratory movements.

The patient died suddenly on March 7th, 1887. On post-mortem examination the heart was found slightly enlarged; the walls of the left ventricle were hypertrophied. The pulmonary artery and the aorta were dilated; the semi-lunar valves of the latter were thinned; its internal surface was of a deep yellowish color; had lost its smoothness and was scattered with yellowish white patches. The abdominal cavity on the left side contained coagulated dark blood. This being removed the epiploon was found partly covered by the stomach, partly extending beyond its lesser curvature, and raised by a large clot. It covered a hemispherical tumor as large as the head of a six months' fœtus, consistent on its upper part, but soft and fluctuating inferiorly. This tumor extended backwards as far as the lumbar vertebra, to which it was adherent by loose connective tissue.

Above and to the right of the upper half, was an irregular opening of about the size of a silver quarter: by introducing the finger into this opening, a very friable mass, feebly adherent, was removed. On looking into the cavity through the opening, there was seen in the posterior part an eliptical aperture with smooth edges, communicating with the anterior part of the aorta. The caliber of this vessel was normal both above and below, and at the level of the tumor, to which it was adherent. The renal and mesenteric arteries were normal. The cœliac axis was replaced by the tumor which has been described. The splenic and hepatic arteries could be recognized immediately above the median circumference and at the anterior part of the tumor. The coronary artery of the stomach could not be found. The aorta was quite healthy in appearance.

TANNIC ACID AS A SURGICAL DRESSING.

BY T. J. HUTTON, M. D.

Tannic acid forms an excellent dressing in three classes of wounds, viz.:

1. Incised wounds, applied after the sutures are inserted or adhesive plaster is on, if the wounds do not require stitching.

2. Small wounds of irregular form and recent occurrence.

3. Wounds of moderate size in compound fractures.

Wherever applicable it excels all other dressings in the following respects: (1) Convenience; (2) Cheapness; (3) Cleanliness; (4) Efficiency.

It is always ready. It costs but a trifle. It requires no greasy mixing, measuring or muddling, and has neither smut nor smell. While of its efficiency I can only say, after sixteen years use, that I am satisfied; I ask nothing better. I first called attention to this neat, choice dressing in an article entitled "Fifty Fractures in Mining Surgery," which appeared in the Med. and Surg. Reporter for September, 1878.

The method of application is simply to keep the wound covered with the powder. Wounds thus treated heal on the average in about one-third of the time required for similar ones treated by liquid, oily or salve dressings.

In converting compound fractures into simple fractures by this method, the flesh wound is often healed in one-twelfth of the time required to heal it by wet dressings or salves that are frequently removed and re-applied. Illustrations are unnecessary if I have once defined the classes of wounds in which this dressing is applicable. Although hundreds of cases thus treated could be produced that would prove interesting reading, I will describe the last case only in which this dressing was employed.

F. J., aged 16, German, on Jan. 26, 1887, was knocked down by a falling tree. Next day he was brought to my office. There was a semi-circular scalp wound six inches in length over left parietal bone, and a fragment of this bone almost the size of a silver quarter stuck up trap-door fashion. The flaps had shrunk wide apart and were swollen and angry, as the injury had occurred twenty hours previously. The entire wound looked sorry, being chucked full of hair, dirt, serous effusion, chips, leaves and brush-wood. The patient was very feeble, but conscious. A dose of whiskey and hot water was administered and the wound douched for one hour with warm carbolized water. When the bony fragment had been gently depressed almost to normal position (I could not succeed in reducing it to the normal level), the scalp wound was sutured with horsehair. Tannic acid was then applied, and directions given that it be dusted on freely every few hours, more especially if moisture should appear over any part of the wound. A laxative was administered, also small doses of aconite and bromide of potassium.

The flesh wound healed by first intention. No fever ensued; the pulse never exceeded 92. The patient went home on the 31st—the fourth day of treatment—and two weeks later his father reported that he was "all right."

GYNÆCOLOGY.

A. W. ABBOTT, M. D., CHAIMAN.

CHAIRMAN'S ADDRESS.

ANTERO-POSTERIOR DISPLACEMENTS OF THE UTERUS.

As bearing directly upon this subject, the following experiments and observations are submitted:

1st. In looking into the air-distended rectum by the aid of a Sims' speculum, the subject lying in the semi-prone position, the neck of the uterus is seen to press the anterior wall of the rectum backward, making a distinct bulging into the rectum, to the extent, in some cases, of one-half its calibre.

2d. Dragging down the cervix, in the original axis, by means of a tenaculum, reduces this bulging, and, if the traction is increased, the prominence will disappear.

3d. If instead of traction we make pressure upon the projection with the finger or probang in the rectum, the same result is produced, and the effect will be to simply bend the neck forward, making an anteflexion if the organ is flexible, or a turning backward of the entire womb if it is rigid, making a retroversion.

4th. In making these displacements, the centre of motion is seen to be, not at the situation of the external os, but about opposite the internal os.

5th. While the traction is being made as above, we observe two bands just above the cervical protrusion, which pass from the sides and back of the region of the junction of the neck with the body of the uterus to about the third sacral vertebra, leaving a triangular interval with a base of about an inch and a half posteriorly, and coming together at an acute angle in front. These are the utero-sacral ligaments, so-called. If the traction is increased these bands can be made to so fold in the walls of the rectum that its calibre will be diminished fully one-half.

6th. On making pressure, in the cadaver, on the spot where the utero-sacral ligaments meet, they are seen not only to infringe on the rectal walls but also to diminish Douglas space laterally.

7th. Again repeating the experiment of traction with the tenaculum in the living subject, these ligaments are seen to be made tense, and to follow the cervix at their anterior extremities, while their posterior ends being more firmly fixed, are uninfluenced by the change of position of the cervix.

8th. On opening the abdomen the intestines are seen lying on the broad ligaments and the posterior surface of the uterus, showing that these ligaments not only act to prevent a swaying of the uterus, but also relieve it of most of the weight above. It must not be forgotten that the uterus falls back from its normal position when the abdomen is opened and the intestines lifted away, both in the cadaver and living subject.

9th. Press upon the uterus in accordance with the natural line of greatest pressure, when the individual is erect, *i. e.*, nearly vertical to the posterior wall of the uterus. The broad ligament is seen to yield a little and

the bladder can be slightly depressed, but the utero-sacral ligaments immediately become tense. Press still harder and the force can be felt transmitted to the pelvic floor, *i. e.*, to the various portions of the levator ani and its fascial covering, as well as to the perineum, showing that the uterus has first, a yielding support in the folds of the pelvic peritoneum with the muscular platysma contained therein; and second, a resisting support which can reinforce the former when a greater pressure is made. The experiment of Savage, of forcible traction on the cervix, and the deductions therefrom as to the natural supports of the uterus, though in the main correct, are not exact, for the traction is made in the vaginal axis instead of in the direction of the natural pressure as found in the erect living subject.

10th. In a careful vaginal examination, the subject lying upon her back, the vagina is found approaching vertical instead of at an angle of 45°, as represented in most of our text books, the uterus forming a very acute angle with the vagina. After passing the edge of the perineum, the finger, in the parous woman, less so in the virgin, is movable in all directions except downwards and forwards, but the vaginal mucous membrane constantly surrounds and follows the finger, showing that while the cellular tissues between the peritoneum and the levator ani are soft and yielding there is no empty cavity in the pelvis, unless the rectum be distended with air, and that all movements of the vagina and uterus are almost entirely at the expense of the displacement of the intestines resting upon the uterus and broad ligament. Ordinary respiration produces no perceptible motion of the uterus unless the atmospheric pressure is altered by opening the vagina and admitting air. A sudden expulsive effort, however, on the part of the subject produces, first, a depression of the uterus and bladder; and second, but almost at the same instant a decided antagonizing contraction of the

firm levator ani and perineum to meet and resist the descent of the soft parts above.

11th. The cervix can be drawn forward and pushed backward in the line of the vesico-vaginal septum to an extent depending upon the extensibility of the utero-sacral ligaments forward and the vesico-vaginal septum backward, average about 1¼ inches.

12th. The bladder in filling pushes the whole uterus backward and at the same time elevates the fundus and correspondingly crowds the intestines out of Douglas cul-de-sac.

13th. It will be found, on making a large number of examinations, that the thickness of the perineum, the depth, length and direction of the vagina and the direction of the axis of the uterus, are subject to considerable variation, conformable, in a large measure, to the size and shape of the bony pelvis.

These experiments and observations go to show:

1st. That if the rectum is disturbed, its contents will make a corresponding pressure on the posterior lip of the cervix.

2d. That the utero-sacral ligaments and the vesico-vaginal septum are the most important factors in fixing the centre of motion for antero-posterior displacements.

3d. That the stretching of the utero-sacral ligaments may favor and maintain constipation by partially occluding the rectum.

4th. That the contraction and induration of the utero-sacral ligaments following pelvic inflammation will draw the cervix upward and backward, and at the same time reduce the calibre of the rectum.

5th. That the uterus lies upon a soft yielding bed composed mostly of the posterior or upper wall of the bladder, a small part of the neck resting upon the posterior or inferior wall of the vagina, and that the utero-sacral

ligaments are also a means of support, but acting by traction upon the body of the uterus like the ropes of a hammock, while the neck falls below and between them.

6th. That these supports are not firm but resilient, and will not resist a greater pressure, without yielding, than that ordinarily caused by the weight of the abdominal contents.

7th. That the bladder resting upon the vagina and vesical pelvic fascia is reinforced after slight depression by the firm levator ani, the rectum and perineum.

8th. That the utero-sacral ligaments, whose sacral extremities are as movable as the rest of the pelvic peritoneum (somewhat less than that of the skin over muscle), become tense sooner than the broad ligament when the uterus is depressed, because they are shorter, and not from any great difference in composition.

9th. That the normal position of the uterus must vary with the varying distension of the bladder, but that, with the bladder empty, the axis of the uterus is in a line with the upper part of the pubic bone continued backward to the third sacral vertebra, except that a slight anteflexion normally exists, which causes the os to point towards the cervix; also that a considerable variation from this position is entirely compatible with health, and cannot be proved to be abnormal. Yet it is probable that a sound cannot be introduced into a normally situated and sloped uterus without first displacing it somewhat, for the reason that the os is too far back and the uterus too nearly parallel to the vagina.

As we have seen, the uterine fundus rests normally upon the posterior or upper bladder wall. It follows, therefore, that there can be no anteversion unless there is at the same time a prolapse of the bladder. We may have a sinking downward of the fundus with a prolapse of the bladder, with general prolapse of the pelvic organs, which almost invariably accompanies the so-called pro-

lapsus uteri, but anteversion simple should not have a place among the misplacements of the womb. Many of the best, among our recent observers, including Winkel, Schroeder, Schultze and Emmet, while perhaps not going quite so far, do hold to the opinion expressed by the latter, "That no degree of anteversion without prolapse produces disturbance, and that no relief is ever obtained by simply lifting the uterus to an upright position unless the prolapse is also corrected." A condition does however exist which simulates and may be mistaken for anteversion, viz.: An elevation of the cervix due to a contraction of the utero-sacral ligaments. This condition is not very uncommon, and is always accompanied by a previous history of pelvic peritonitis or cellulitis. The fundus occupies its normal position, but the cervix is so high and so far back that it is with difficulty brought into view when the bivalve speculum is used, the procedure invariably producing pain, as does the drawing forward of the cervix by the finger. We may therefore limit the number of antero-posterior displacements of the uterus to four, viz., posterior elevation of the cervix, retroversion, anteflexion and retroflexion, the two latter accompanied by a deviation from the normal axis of the uterus itself.

Retroversion, ante and retroflexion, usually have no previous history of inflammation. Leaving out the cases of retroversion and retroflexion due to subinvolution of the uterus in the parous woman and the relatively rare cases of displacement due to the dragging of tumors and adhesions, falls, etc., we may expect to find the causes for these three forms of misplacement in the great majority of cases in certain natural conditions within the pelvis.

If, instead of using the probang in experiment three, we substitute the result of continued constipation, viz., a large mass of hardened feces, we can see how the cervical projection in the rectum will be pressed forward if long and flexible, and an anteflexion gradually produced. If

the cervix be shorter and rigid the uterus instead of bending will be turned backward, as a whole, producing a retroversion. After a retroversion has once taken place, so that the fundus lies in Douglas sac, and the intestines fall upon the anterior surface of the uterus which has now become superior, a retroflexion is produced by the fundus being crowded between the sacral and the cervix, the utero-sacral ligaments acting as a fulcrum, just as in anteflexion. It is therefore apparent that anteflexion, retroversion and retroflexion may be simply consecutive steps in the same result from a common cause. A rigid muscular posterior wall of the vagina will account for some cases of anteflexion, while a bladder frequently distended will help to increase the chances of a backward displacement.

The boat shaped cervix with the projecting upper lip and the flattened cervical spaces so generally seen with anteflexions are almost proof positive of the correctness of the above theory.

Here we may briefly take up the question: Do misplacements and flexions of the uterus do harm in themselves, or are the symptoms accompanying them due to an accidental co-existing inflammation or catarrh. In reply we would say without hesitation that versions and flexions during the child bearing period and sometimes afterward, do almost invariably produce unpleasant symptoms, among the most important of which are, sterility, dysmenorrhœa, menorrhagia, amenorrhœa, oblique inguinal pains commonly called ovarian, dyspareunia, sciatic and antcrural pains, rectal and vesical tenesmus, and gastric, submammary, cardiac, cephalic and spinal reflex pains and disturbances of functions; that the pathological conditions, at least maintained, are where recent acute venous congestion of the uterus, when of long standing hyperplasia, cervical catarrh, prolapse and enlargement of the ovaries in retro-displacements and an intensely irritable condition

of the canal at the isthmus in anteflexion. That the symptoms are brought on in a large measure by the displacement and not entirely by an attending inflammation is shown by the immediate relief often afforded by replacement before time can have elapsed for cure of inflammatory condition.

The following cases will briefly illustrate some of the above points:

1st. Mrs. U. fainted on walking from carriage to office door; intense bearing down pain, uterus retroflexed and sensitive. Uterus replaced and lever pessary fitted. Immediate relief from pain and walked six blocks on leaving office.

2d. Mrs. Carrie O., metrorrhagia with intense pelvic pains. Uterus as large as at third month of pregnancy, completely retroverted so that cervix was wedged behind pubis, elevating the bladder, the fundus opposite the cervix. Uterus replaced and followed by an appreciable diminution in size within 10 minutes with relief from hemorrhage while pessary was worn. There can be no question as to the facts and deductions in this extreme case, as the pessary was removed and replaced on three separate occasions with corresponding returns and relief of symptoms.

3d. Mrs. J., well marked angina pectoris, with pains extending to left arm and hand, daily exacerbations, uterus retroflexed. Immediate relief on reposition of uterus. Angina returned twice when pessary was removed and uterus fell back, relief following each replacement with final absence of angina for last two months while uterus is in place.

4th. Mrs. P., almost complete anorexia with nausea and vomiting after taking food or drink for six weeks. Bedridden from pain and weakness. Retroflexion of uterus and prolapse of left ovary. Immediate relief of gastric symp-

toms after replacement. Doing a part of her housework in six weeks, Alexander's operation having been performed in the interval.

The treatment of these displacements consists naturally of replacing the uterus and keeping it in its normal position. In anteflexion the cervix cannot be kept in its normal axis by any known means, that is, not at the same time productive of harm. A simple hard rubber lever pessary, Ewarts for instance, will in some measure keep the cervix from pressing on the posterior wall of the vagina, and will often afford marked relief from the dysmenorrhœa. A lever pessary with a diaphragm on the lower part of the posterior curve for the purpose of giving the cervix more room, has not been sufficiently tried by me to warrant an opinion as to its merits. Rapid dilatation, which not only opens the canal, but shortens the cervix, is in many cases of great service. In all cases where any modification of Hodge's lever is used, great care should be taken to have the instrument so narrow behind that it will not give pain by spreading the utero-sacral ligaments.

In posterior elevation of the cervix the glycerine tampon not only gives comfort by raising the cervix and relaxing the utero-sacral ligaments, but assists in the absorption of inflammatory products.

In retroversion and retroflexion the best forms of the lever pessary are Albert Smith's, Thomas and Emmett's. These are well borne ordinarily and effective, the shape, of course, being altered to fit each individual case. The great merit of the lever pessary is that it lies in and moves with the vagina and does not take up unncecessary room. Most of the thousand other pessaries in addition to other objections do not put the uterus in its normal position. Great care must be taken to have the pessary long enough to carry the cervix backward far enough to raise it to its

natural level and to extend the vagina beyond its normal length so as to favor the falling forward of the fundus. The uterus should be replaced before the pessary is introduced. If it is then found that the uterus is still backward, with the fundus bearing on the pessary, the replacement should be made complete before the case is left. The repositor of Marion Sims with Emmett's modification, notwithstanding its fault of sometimes scratching the endometrium, is unquestionably the most scientific in construction and successful in application, for it not only lengthens the vagina and carries the cervix upward and backward, but it, at the same time, throws the fundus forward on the bladder so that the intestines will drop behind and upon the whole uterus. All other repositors, including the sound, not only fail to carry the fundus completely forward, but they make the external instead of the internal the center of motion.

This complete replacement of the uterus will ordinarily suffice for the reposition of prolapsed ovaries, they being carried up by the ascending fundus, unless the mesovarium is too long. (We have seen it 1½ inches.) In a few recent cases, a simple replacement is all that is needed. In most cases however, the pessary will need to be retained, with occasional removal for purposes of cleanliness, for from two to six months. In certain cases, although there are no adhesions, the uterus and supports have been in a false position so long, that the organ cannot be fully replaced at first without great pain. In such a case a short pessary is at first admissable, a longer being substituted as rapidly as possible until the normal limit of the vagina is reached. A pessary does not fit and should not be retained if the patient is aware of its presence after twenty-four hours. As a general rule the pessary should not be felt at all after insertion.

In a large number of cases the uterus will immediately return to its false position after the removal of the pes-

sary, although it may have been retained in perfect position for six months or more. In these cases resort should be had to Alexander's operation of shortening the round ligaments. In many cases, unfortunately, a previous peritonitis has fixed the uterus in its false position by adhesions. The pessary, or even Alexander's operation, is ineffectual and dangerous in these cases, and here the only alternative is laparotomy, if the symptoms are sufficiently aggravated. Breaking up the adhesion, the uterus may be fastened to the abdominal wall, the round ligaments may be shortened, or what is generally preferable to either, a retroversion pessary may be worn for a few months without discomfort and with a good prospect of cure.

The following cases illustrate this condition:

1st. Mrs. P., washerwoman. Uterus retroflexed and immovable; R. ovary enlarged and both in Douglas sac, tender and immovable. Patient unable to do any work, every attempt being followed by intense pelvic pain and prostration, intense dysmenorrhœa. Expressed herself as anxious to run a risk of 75 per cent if necessary for the sake of possible relief. Abdominal incision of two inches, uterus, ovaries and tubes in a network of old adhesions. R. ovary cystic, R. tube a little dilated and containing fluid; adhesions all broken up; R. ovary and R. tube removed, fundus of uterus raised and fastened to anterior abdominal wall by two double catgut threads, one at each horn. Catgut gave away on fourth day and pessary substituted. In four weeks the uterus remained in place after removal of pessary, and in six weeks patient able to work and to walk two miles without discomfort. Menstruates regularly and without pain.

2d. Mrs. G. Bedridden for a year, nausea and vomiting after eating or drinking, constant pelvic pain and headache. Uterus retroflexed, cannot be fully replaced; ovaries prolapsed. Cervix operation had been previously

made without relief. Is willing to run any risk for chance of cure. Abdominal incision two inches, both ovaries cystic, L. tube adherent to sigmoid flexure of colon. Both ovaries and tubes removed, uterus replaced and pessary inserted. Slow recovery, but the uterus remained in normal position after removal of pessary in two weeks.

These cases quite confirm the opinion expressed by Dr. W. M. Polk in a paper read before the N. Y. Obs. Society, April 19, 1887, "that the only cure for retroflexed and adherent uterus is in abdominal section and relief of adhesions."

In regard to the use of the cotton or wool column in these cases, we do not hesitate to say that to one who has once had his hand in the meshes of pelvic adhesions, the impossibility of a cure by this method is self-evident. A glycerine tampon will unquestionably do good medically, but the mechanical effect of the column is seldom so perfect as that of a well selected pessary. Experience abundantly and positively proves that if the principles above laid down are carefully followed a case of antero-posterior displacement of the uterus will seldom present itself that cannot be perfectly and permanently cured.

RECENT ADVANCES IN GYNÆCOLOGY.

BY EDWARD C. SPENCER, M. D., ST. PAUL.

In the following short paper I shall not attempt to make any resume of the gynæcological literature of the past year, but shall confine myself to the consideration of the changes and improvements which have been made in the medical and surgical therapeutics of the diseases of women. No startling advances or important discoveries have been made. The general improvement has been along lines already indicated and consists chiefly in sifting out the worthless and making the good better.

Very good results have been reported in the treatment of uterine fibroids by electrolysis. The treatment has not however been extensively used, being confined to the practice of but few men, notably Apostoli, and in this country Freeman and Byrne. Apostoli, who seems to have had the best results, uses a very strong galvanic current, rarely less than 200 milliamperes and often much more. Both needles, carefully insulated except near the points, are introduced into the tumor rather near together, and a strong current passed for ten or fifteen minutes. In some cases rapid improvement as regards pain and hemorrhages, and diminution in the size of the tumor followed.

The method is not free from danger, death sometimes occurring from sloughing and septicæmia, and sharp attacks of peritonitis being not uncommon. It is especially applicable to sessile, well-nourished growths, and in those having a good blood supply through adhesions, since in these cases the products of the electrical decomposition are quickly absorbed, and rapid decrease in size follows. It is well worth a careful trial, particularly where the alternative seems to be a hysterectomy or even a Hegar's operation. In this connection it is well to re-

member the often repeated observation of Emmet, that he has never seen a case of death from hemorrhage from a uterine fibroid. Keith has recently made the same remark concerning his own practice.

In the treatment of chronic subinvolution of the uterus together with the endometritis always accompanying it, Apostoli also makes use of electrolysis. He claims in 500 cases so treated to have had better results than by any other method known to him. If used at all, it should be used thoroughly and carefully. He uses a galvanic current of the strength of 200 milliamperes, the amount given by 30 cells of a Leclanche battery. A large electrode of clay is placed over the abdomen, and a metallic electrode, carefully insulated, introduced into the uterine cavity. The intra-uterine pole is always negative except in hemorrhagic cases. The current passes from five to ten minutes, and is used from once a week to every other day. It destroys the mucous membrane and produces a copious discharge at first. Careful antiseptic precautions are taken before and after treatment, and rest in bed is enjoined. Improvement is said to take place in a few days and a rapid cure follows. He claims that his treatment is less dangerous than the use of the curette, and that the resulting improvement is more permanent.

The never-ending controversy between the advocates and the opponents of intra-uterine treatment in such cases as these has been carried on actively during the past year. The proverbial unreliability of statistics is more apparent than usual in this connection, but perhaps the best and most striking are those furnished by Dr. Emmet. In his private hospital he finds that the average length of treatment has been shortened several weeks since he has discontinued the use of intra-uterine applications.

Some improvement has been made in the treatment of cancer of the uterus. These cases are now felt to be by no means hopeless, and the operation, by whatever

method chosen, is more radically done. The primary mortality in abdominal hysterectomy is reduced in common with the diminution in the death rate in all laparotomies. The best results in vaginal hysterectomony (complete) are those reported by Bruenecke, eighteen cases with three deaths. Probably the best paper recently written on the subject is one by Koeberle. His views are so in concordance with the pathology and clinical history of the disease, together with the course it takes after operation, that they will be probably recognized as authoritative when the present high tide of abdominal surgery shall have begun to ebb.

In the very rare cases of cancer of the body of the uterus or of the mucous membrane of the body, when the cervix is uninvolved a supra-vaginal hysterotomy is always preferable to the more dangerous hysterectomy, whether vaginal or through an abdominal incision, and will be as effective. In the ordinary cases where the growth begins in the cervix, the vagina and broad ligaments are usually involved before the body is much affected, and here a hysterectomy is useless. In cases beginning in the cervix and extending into the cavity of the uterus not involving the vagina, vaginal hysterotomy with complete digging out of the new growth offers the best results. The immediate danger is slight, and the prospect of ulimate recovery fair.

Baker, of Boston, has long been working in accordance with these views. He begins by doing a complete high amputation of the cervix; if necessary he then goes high up into the cavity of the uterus, digging out all diseased tissue with scissors and cautery until sometimes only a shell of the uterus is left. Out of ten cases thus treated by him, six were alive without recurrence of the disease four years afterward. Success seems to be proportional to the thoroughness of the operator.

The diminution of mortality following abdominal section

still continues. Though largely due to increased skill and an improved technique, it depends somewhat on the fact that abdominal section is done much more often in simple cases than formerly. The "simple and entirely safe" exploratory excision is done every day, often through sheer laziness. It is an open question whether we have not advanced too far in this direction, especially in the treatment of the so-called uterine appendages. Undoubtedly many of the diseases for which the ovaries and tubes are now removed recover under the ordinary local treatment, or even when let alone. When woman recovers from the notion that she is an organism built around a tube or an ovary, it will go better with her.

One of the chief advantages of exploratory abdominal incision is seen in cases of ascites. This has been especially emphasized during the past year. It may now be considered a safe rule, to which the exceptions are very few, that the peritoneal cavity should be opened in all cases of ascites not due to disease of the heart, kidneys or liver. Even in some cases due to obstructive disease of the liver, it has been advocated as preferable to the routine tapping. It is of great value in those cases, not very infrequent, where the ascites is caused by some small pelvic growths not recognizable through the vagina or the abdominal walls.

The results have been especially gratifying in cases of tubercular peritonitis. Hegar has reported two cases in which he opened the abdomen, removed the fluid and dusted in iodoform. Recovery followed. Four cases are reported by Hofmeier in which there were proliferations in the peritoneum as large as hazelnuts, resembling in gross appearance multiple carcinoma. Ascites did not recur after the introduction of iodoform. Numerous other cases were reported at the Gynæcological Congress at Munich, treated by iodoform, or by incision and evacuation of the fluid alone, and it was the general sentiment

that tubercular peritonitis did not offer at all a bad prognosis.

The conservative Cæsarian section has again pushed its way to the front, presumably to stay, mainly through improvements made in operating by Saenger, whose name the operation now bears. Done carefully and according to his method, it has given a greater percentage of recoveries than the Porro operation. Both theoretically and practically it seems the simpler operation, and hereafter the Porro will probaby be used only when indicated by some special conditions of the uterus or the patient.

The Alexander operation is so attractive in its theory and apparent results that it is no wonder that it has suddenly become very popular. It is very doubtful, however, that it will stand the test of time. At the present, statistics are misleading, the cure or non-cure of a case depending largely on the bias of the reporter. Personally I have not been favorably impressed in the cases where I have seen it done. They may be divided broadly into two classes, (1) those which could have been cured by one or more of the common plastic operations, and (2) those in which, by reason of the adhesions, smallness of the ligaments and difficulty in finding them, the operation was not, and presumably could not be properly done. Although the operators were above the average in experience and special skill, the results were not gratifying.

Hysterorrhaphy, or suturing the uterus up close to the anterior abdominal wall above the symphysis, seems to be the latest rival of the Alexander operation. One chief advantage it has is that it gives the operator the opportunity of easily breaking up all the adhesions binding it down, so that all tension is relieved. So far as can be judged from the limited number of operations done up to date, there seems to be a tendency to recurrence of pelvic inflammation back of the uterus, by which the anterior attachment is severed and retroversion again produced.

In the department of plastic surgery little or nothing has been done. In spite of the many improvements which have recently been made by nearly everybody in Emmett's perineal operation, the old gentleman still continues doing it in his own way rather better than any of his improvers.

It has happened that no radical changes or beneficial discoveries have been made. There has been no special intellectual activity in any one new direction. This condition is perhaps a healthful one. Gynæcology, a comparatively new branch of medicine, has had somewhat of a mushroom growth. Like some of our western towns, it extends over a large area, and now before it straggles farther it will do it good to start again and build up solidly from the center.

PELVIC CELLULITIS AND PERITONITIS.

BY MARY G. HOOD, M. D., MINNEAPOLIS.

In bringing before you the above topic I am well aware that the theme is well worn, and that I have nothing particularly new to offer; yet I make no apology for relating it as I have seen it in my own practice, for it is a subject so constantly before us on the gynæcological table as to make its frequent review profitable. Although some of the very recent writers are contending that *post* and *ante-mortem* examinations do not corroborate the statements of frequency made by Emmet and others, the disease is undoubtedly of sufficient import, and is so disastrous to the health of the victim, and so sure an attendant upon the careless manipulations of the pelvic organs that every general practitioner, not only the specialist, should be conversant with its diagnosis, results and treatment.

The disease which we have called pelvic cellulitis and peritonitis is known by several names, more or less descriptive of the lesion. Periuterine phlegmon, a name given by early writers, describes only an occasional result of the disease. Perimetritis, meaning inflammation of the pelvic peritoneum and parametritis of the cellular tissue, as given by Virchow, are not clearly descriptive. Sir James Simpson and Dr. Graily Hewitt agree in calling it pelvic cellulitis, while Dr. Emmet adds peritonitis as further descriptive of the true condition. Thomas considers this too broad, and narrows it down to periuterine cellulitis, considering peritonitis as a separate disease. Certainly there are two distinct conditions, but in practice they are so often associated and so difficult to differentiate as to be conveniently treated as one.

Let us look for a moment at the anatomy and pathology of the tissues which are the seat of this inflammation.

The pelvic cellular tissue, some one has said, fills all the space between the roof and the floor of the pelvis, except that which is occupied by the viscera. The pelvic organs do not come in contact with each other at any point, but are everywhere separated and supported by this almost infinitely expansive and elastic cellular tissue. It is continuous above with the tissue covering the iliac and psoas muscles posteriorly, and anteriorly with that which lies between the peritoneum and transversalis fascia. It is traversed by numerous blood vessels which supply the pelvic organs. It may be called the packing tissue completely surrounding and supporting as it does all the organs, preventing jar and equalizing pressure. In immediate contact with this cellular tissue above and forming the upper boundary of the pelvis lies a serous membrane, the peritoneum. It covers all the organs and is tucked down between them in such a manner as to embrace them in its folds and form the six uterine ligaments which are the most apparent supports of the uterus. The

broad ligaments are formed by a reduplication of the peritoneum which enfolds the uterine body, ovaries, tubes and round ligaments. This fold attaches itself on either side to the walls of the pelvis, thus dividing the basin into an anterior and posterior chamber. The peritoneum is closely adherent to the uterus over the fundus, no connective tissue having been demonstrated between them, but between the folds of the broad ligament cellular tissue is abundant; passing down in front of the uterus to the cervix it is reflected onto the bladder, forming two semilunar folds, the anterior uterine ligaments. Posteriorly, according to Winkel's position of the uterus, it passes nearly horizontally backward to a little distance below the cervix, is reflected on to the post pelvic wall covering the rectum, and forming the retro-uterine ligaments and leaving a depression between them,—Douglas' cul-de-sac.

The cellular tissue of the pelvis, like the same tissue in other parts of the body, is made up of interlacing fibers of yellow elastic and white fibrous tissue, running in all directions and so disposed as to leave interstices or cells, communicating freely with each other and capable of being greatly distended by air or fluid when pressure is brought to bear upon them. In the natural state of the body, however, no such interstices exist, the fibers lying in apposition so as to form a continuous membrane. The mixture of yellow elastic fibers gives to the tissue its capability of distension and also its contractile power. When this membrane becomes inflamed the increased blood pressure in the numerous blood vessels with which this part is supplied, quickly fills the cells with liquor sanguinis, producing the œdema and consequent puffy feeling of the first stage. When the inflammation passes on to the second stage the œdema is replaced by the exudation of plastic lymph, capable of coagulation and organization. Here the process may come to a standstill and resolution begin by the lymphatics taking up the

exudative elements, or the pus-cells already found in the lymph may multiply and the exudate undergo inflammatory softening.

The peritoneum is a structureless membrane, supported by cellular tissue and lined by pavement epithelium moistened by the serous fluid which it secretes in small quantity. When inflammatory changes take place this fluid is increased in quantity and contains a larger amount of fibrin, with pus-cells and red blood corpuscles. These elements vary in quantity according to the character of the inflammation, whether fibrinous, purulent or hemorrhagic. If the character be fibrinous, we have adhesions formed. At first these are very delicate threads of tissue readily separated, but in time they become fully formed and strengthened into firm bands. If the inflammation be purulent, pus is formed and in considerable quantity, and may become sacculated by adhesions around the edges of the purulent collections.

An acute attack of pelvic cellulitis or peritonitis is often ushered in by a chill, usually slight and sometimes entirely absent. When present, reaction is soon established and the temperature rises to 102° or 103° F. At this stage the patient will be found lying on the back with the knees drawn up so as to relax the abdominal walls, with no inclination to turn, as every movement increases the pain. An examination will now reveal more or less abdominal tenderness, according to the extent of peritoneum involved, perhaps confined to one or other iliac region. The abdominal muscles will become tense when pressure is attempted, to protect the tissues below from interference. A vaginal examination will find the vagina hot and swollen with a peculiar boggy feeling in the roof of the pelvis, caused by serous infiltration of the tissues. It is not often that the physician has an opportunity to demonstrate this condition as it lasts only a few hours, and we often do not reach the bedside until it has

passed off. Soon the infiltration is replaced by the exudate of plastic lymph, and the whole or part of the pelvic roof is hardened, a peculiar stony hardness, which seems immediately under the mucous membrane. The uterus and other organs are, more or less, fixed in position, the bladder becomes irritable, there is pain upon defecation, and usually within the first few days there is uterine hemorrhage, or if the patient is menstruating, the flow is increased.

This condition continues for two or three days when there is a defervescence of temperature and nature makes an effort to rid herself of the inflammatory products in one of two ways—by resolution or by suppuration. If by resolution the hardness gradually melts away, the organs become movable again, and in a few days or weeks, for cases differ so greatly that no definite prognosis can be made, no intimation of the disease remains, except possibly some bands formed by cicatrization and contraction of the injured tissues.

If the case results in suppuration pus probably begins to form from ten to fourteen days after the exudate is complete; but as the formation of pus may begin in the center of the mass it may be some weeks in making its way to the surface where it can be detected. The formation of pus may be announced by the usual symptoms, chills, fever and sweats. Again the exudate may remain stationary for months or years, or until it is forced to resolve by treatment.

Now let us look at a case of the other extreme, decidedly subacute. A patient comes to the office; she walks carefully as if fearing the jar of each step. Her body is bent slightly forward and she says she cannot straighten up. She tells us that for a month or perhaps two or three, she has had some pain in one or other inguinal region. She will probably describe it as in the ovary, and she may not be far from right as these are the

cases where the inflammation spreads to the cellular tissue from other organs. The pain and soreness have been continuous and perhaps increasing until her daily avocations have become a burden. We place her upon the table and upon examination we find the uterus probably deflected from the median line toward the affected side if the case be an old one and shrinkage has begun. In sweeping the finger around the pelvic roof it will be found natural and free in most of its parts, but we are arrested by an unnatural condition, probably in one of the broad ligaments or Douglas's pouch, and as we touch it the patient informs us that it is sore and perhaps shrinks away with a sudden expression of pain. I say *unnatural condition* because it may vary from distinct and comparatively well defined hardness to a general thickening of the tissues. The inflamed portions if small may be more difficult to find and can only be detected by thorough palpation of the whole pelvic tissues with one hand on the abdomen, and indeed, a rectal examination may be necessary as through the rectum the upper part of the pelvis and particularly Douglas's sac can be more easily reached.

This difficulty in finding the exudate where it is high up and not extensive, may occur as well in the acute cases as in the subacute, and again the exudate may be extensive in the subacute cases. Indeed the great variety of conditions and the general symptoms being not always proportionate to the local difficulty makes the inaccuracy of diagnosis of which Emmet accuses us when he says that "cellulitis, when slight in extent, is seldom recognized by the general practitioner."

There are certain conditions which seem to predispose the pelvic cellular tissue to inflammatory action. Foremost among these stands the puerperal state, owing to the in- [illegible] ts and the wounds of the [illegible] ily exist after parturi-

tion. Any break in the continuity of the mucous membrane of the genital tract may predispose to inflammation. Operations on the genitalia, dilatation of the cervix by tents or even passage of the probe may open a way for septic absorption or be a starting point for an inflammatory process which may rapidly spread to the parametrium. Another common etiological factor is the spread by contiguity of structure from chronic inflammation of the pelvic organs, as ovaritis, salpingitis or endometritis. Indeed some have argued that primary cellulitis or peritonitis never occurs except in case of direct violence as from the rupture of a Græfian vesicle, pelvic hæmatocele or a direct blow, but is always secondary to inflammation of some of the organs. Gonorrhœal infection, abortion and particularly criminal abortion, sudden suppression of menstruation by cold and excessive physical exertion under some circumstances may produce a secondary inflammation.

Can pelvic cellulitis be differentiated from pelvic peritonitis? Thomas says "yes," Emmet says "no." In some typical cases most authorities agree that the diagnosis can be made. Where they are associated one or other predominates in a certain proportion of cases, giving a type to the disease, but in many it seems almost impossible to say whether both exist, or if so which predominates. Where the exudate is circumscribed and confined to one or other broad ligament and the rest of the pelvis is normal, a diagnosis of cellulitis would probably be correct. Or where the temperature is high, the pain is intense, the exudate fills the roof and is confined *to* the roof, and gives the impression upon touch of cellular tissue intervening between the exudate and the mucous membrane, peritonitis would be quite evident.

An acute case with the chill, fever, pain and tenderness, there is little danger of confusing with salpingitis, ovaritis, ovarian and fibroid tumors or hematocele; but in

the subacute or chronic cases the diagnosis is not always easy. An ovary and tube inflamed and matted together, may closely simulate an exudate in the broad ligament, but the history of the case and the different behavior during menstruation, the salpingitis occasioning scanty and painful menstruation and the cellulitis more likely painless and profuse, will aid in diagnosis. From fibroid or ovarian tumors the diagnosis is often difficult, and time and patient watching for development may alone clear up the doubt. Hematocele appears suddenly while cellulitis is more gradual. As the hematocele grows harder there comes a stage when the diagnosis may be difficult, but the history and the behavior upon watching will generally decide the case.

Whatever variety of the disease we have to deal with, or at whatever stage, rest and the hot vaginal douche must be our main reliance. If we are called to a patient who has just passed through the chill, and have made the diagnosis of cellulitis or cellulitis combined with peritonitis, or if we are not sure of the diagnosis, let us make the attempt to arrest the attack as after twelve hours it will be too late. Get the patient to bed with as little exertion as possible, give a full opiate to insure quiet, place a large and very hot poultice over the abdomen and begin the hot water douche. The douche is so well understood by the profession as to need no explanation, and I yet am pursuaded that it is rarely thoroughly enough given to reach such a case. The water should not only be very hot, but should be kept running for twenty-four hours constantly, or as near that as we can compass. Short intermissions may be allowed to rest the patient, but under the influence of opium the restlessness may be greatly diminished.

My usual direction is to use three or four gallons of water every hour or two and allow it to run very slowly, and unless I have a trained nurse I give it my personal

supervision until I am sure the attendant will be thorough. The second twenty-four hours give one every four hours, and subsequently three or four times daily until recovery is complete. By this means I feel sure many cases may be aborted or at least the damage very greatly curtailed. Quinine and nourishing though light diet form an important part of the treatment. It has been my practice to keep the bowels open from the beginning by giving a mild laxative each night, such as the compound liquorice powder. I am aware that in this I presume to differ with some of our best authorities, but an easy evacuation every day has seemed to me to do less damage than the hard masses which are apt to pass after several days of constipation.

In the subacute cases the same treatment is no less imperative, though the results may be less brilliant, and perhaps partly because thoroughness is so much more difficult to enforce. If pus be formed as announced by chills, fever and sweat, or if fluctuation can be detected, which should be continually watched for in every case, an opening should be made immediately and free drainage established. The cavity should be thoroughly washed with a disinfectant solution once or twice daily. If the cavity be small, holding not over two ounces, Munde advises treating by aspiration. We may not be able to detect fluctuation before the abscess has made a spontaneous opening into the rectum, bladder, vagina or peritoneum.

If into either of the two former the case will be difficult to manage as the opening will probably not be large enough to insure free drainage and be almost impossible to find. If the opening be found in the vagina it should be enlarged to insure drainage. If it open into the peritoneum death will probably be the speedy result. If, however, the case is one of chronic exudation where the pain and tenderness has disappeared and the patient seeks

relief from the reflex symptoms, complete rest is not so necessary; a moderate amount of exercise may be allowed, but with careful avoidance of any jar which may again light up the smouldering flame. Here copious hot water douches followed by application of iodine to the roof, the application always to be made through a Sim's speculum, and a thorough glycerine tampon; in addition a hot sitz-bath at night, painting the whole abdomen with iodine and means to keep the general health in good condition will be the most efficacious treatment we can institute. Galvanism with the positive pole internally will oftentimes have a marvelous effect in improving the circulation and melting away the exudation.

Pardon me if I append a few cases in illustration of some points. I might multiply them, but am sure I have taxed your patience long enough already.

Case 1, illustrating a probable cause in the passage of a thoroughly antiseptic probe, and also a cellulitis aborted by the hot water douche.

Mrs. R. M. under treatment for endometritis with abrasion of the os-uteri. On June 16, 1882, passed through the internal os a probe wound with absorbant cotton and dipped in equal parts of carbolic acid and glycerine; painted the vaginal roof with iodine and introduced a pad of glycerine. June 19th, three days later, was summoned to her bedside. She had a slight chill about two hours previously; temperature 102° F. under the tongue, pain and tenderness in lower part of the abdomen. Vagina very hot and puffy in the right broad ligament and exceedingly tender. Placed her immediately under the influence of opium, gave ten grains of quinine and ordered copious vaginal douches of hot water every two hours. The next day, June 20th, temperature normal; pain and tenderness much less; continue opiate and douches every three hours. June 21st, no pain, ten-

derness very slight, continue hot water every three hours. June 23d, has continued to improve, no pain, slight tenderness still in right broad ligament, but no swelling nor exudate; considered the patient convalescent but continued the use of the douche.

Case 2, illustrative of a subacute case with slow recovery.

Mrs. G. had been under my care six months previous to present attack with a slight endocervicitis from which she recovered so far as to consider her health good through the winter. While house-cleaning in May, 1883, was troubled with pain and soreness in left side, but had not been so bad that she gave up her housework until the past few days. On June 26 she sent for me. I found a somewhat diffused exudate in left broad ligament, excessively tender, temperature 101°. I sent her to bed, told her to keep quiet and use a hot vaginal douche three or four times daily, and paint the lower part of abdominal wall freely with iodine, twice daily, as much of the time as she could bear it. My directions were only partly carried out, and three weeks later she came to the office, still very tender, the exudate somewhat smaller but every step painful. The same local treatment continued with the addition of a small pad of cotton saturated in glycerine, introduced by patient once daily after the douche. After some months of this treatment, during which time I saw her only two or three times, all pain and soreness disappeared, and there was only a slight thickening of the tissues on that side left to mark the spot.

Case 3, illustrative of a case where the peritoneum was probably involved and treatment neglected for forty-eight hours.

Mrs. C. has had two previous attacks of cellulitis partly aborted by hot water. While traveling, eighteen hours

before reaching home, was taken with severe pain in hypogastrium, which continued unabated and rather increased by the motion of the train, until reaching home, when after a hot bath and quiet in bed, felt somewhat relieved and deferred sending for a physician until the next morning, May 13th, 1884, when she had a pronounced chill. Upon reaching the bedside I found the temperature 103.5°, the abdomen excessively tender, the vaginal roof filled with exudate, though the left side seemed fuller than right. Treatment: large hot poultices to abdomen, vaginal douche of hot water, four or five gallons every two hours, quinine to control temperature, and one-fourth grain of morphia, hypodermically, followed by one grain of svapnia every three hours, or as needed to keep the patient somnolent. Under this treatment, after three weeks, temperature and pain subsided, but the tenderness and exudate in left side were still persistent, filling the broad ligament, reaching three inches above pelvis and down into Douglas's cul-de-sac. Patient was allowed to sit up and to move gradually around the house, but kept under frequent surveillance until the last day of July. When I next saw her upon the 8th of August, temperature was 100.5°, and I thought I could detect indistinct fluctuation over a very small spot in Douglas's sac. Being obliged to leave town for two days, I left her upon quinine and hot douches until my return. August 11, examination revealed a distinctly fluctuating tumor about the size of an oval nut, just posterior to the cervix. August 12, Dr. A. W. Abbott, whom I called in consultation, made a free incision into the tumor, and about three ounces of healthy pus escaped; a drainage tube was introduced, and the cavity was washed out twice daily until the middle of December, when, as there was no further discharge, the irrigation was stopped and the abscess closed.

ALEXANDER'S OPERATION FOR SHORTENING OF THE ROUND LIGAMENTS OF THE UTERUS.*

In June, 1885, Dr. Wm. Alexander, of Liverpool, England, before the British Gynæcological Society read a paper upon this subject, in which he stated that the operation was originally devised for a large number of uterine displacements that infested the gynæcological wards of Liverpool Workhouse. His first operation was made, we think, in the latter part of 1881, and up to May 20th, 1887, he informs me he has made about one hundred operations, fully three-fourths of which are permanant cures in every way.

The operation consists in shortening the round ligaments of the uterus for the purpose of bringing its fundus forward upon the bladder, and is applicable in all cases of retro-displacements and prolapse where there are no adhesions. The operation is best described in his own words, which may be found in the Journal of the British Gynæcological Society, part III, vol. I, page 246, from which we extract the following:

"The pubic spine is the first landmark. From this an incision is to be made upwards and outwards in the direction of the inguinal canal for one and a half, two or three inches, according to the fatness of the subject. The dissection must be continued downward until the pearly glistening tendon of the external oblique muscle is reached. If the operator succeed in hitting the spine, the external inguinal canal, with the inter-columnar fibres crossing it, can also be seen. If not, the aperture now made down to the muscles can be dragged over an extensive area by retracters, so that the region can be searched until the ring is found. The finger, passed to

*The author of this article has neglected to sign his name to it.

the bottom of the wound, may be used to detect the spine and the ring outside; the former by its hardness, and the latter by its lessened resistance compared with that of the aponeurosis around it.

"Having clearly isolated the external abdominal wound, and tied or compressed any little vessels necessary to be attended to, the next step in the operation may be entered upon, viz., to find the end of the ligament. The inter-columnar fascia, which is generally pushed forwards by the fat and other structures beneath, is to be cut through over all the extent of the external ring and in the direction of its longest diameter; a nerve, some vessels, fat, some tendinous bands, and the round ligament spring out of the canal immediately. In fat people the quantity of fat conceals all the other structures.

"No 'grabbing' at the mass is now to be practiced, as some have recommended. By everting all the structures upwards the round ligament can be seen, generally at the lowest part, and with the white easily distinguished genital branch of the genito-crusal nerve along its anterior surface and close to it. The ligament at this stage is more or less rounded in shape, sometimes rather delicate, but are always easily recognized flesh-colored structure, that might be easily destroyed by forceps rudely and blindly applied. Should the ligament seem very frail, or the operator be doubtful whether he has found it or not, he should take care not to displace the structures, or to destroy them by searching or pulling. His best plan in such a case is to open up the inguinal canal a little and then re-examine what he supposes to be the ligament.

"The difficulty in finding the ligament need thus never be experienced, provided the operator knows what he is about. When the ligament is clearly identified, the small nerve on its surface is to be cut through without cutting any of the ligament. Then gentle traction is to be made,

either by the fingers or broad blunt-pointed forceps. Care must be taken not to break the ligament by such traction. Bands will now be seen holding it to the neighboring structures. These should be cut through with scissors, the greatest caution being used to avoid touching the ligament itself at the same time. With a little patience and perseverance the structure is so far free that all resistance is at an end, and it comes out as easily as if broken inside, as Dr. Munde thought it was in his first case.

"As soon as it begins to peel out, and without drawing it out further, I leave that side after covering the wound with a clean sponge and operate on the opposite side. To do so my assistant and I change sides, so that I always stand on the side opposite to that on which I am operating. I can look thus better into the canal and draw the ligament more conveniently towards me, but of course the operation could be performed without this change of position. Having freed the opposite ligament, the difficulties of the operation are at an end, and the second stage is finished.

"The third stage consists in placing the uterus in position by the sound, and pulling out the ligaments until they are felt to control that position. The replacing of the uterus is first performed, and is held in position by a third assistant. The operator pulls out both ligaments almost simultaneously and gently until the sound is felt to be slightly moved. He then hands both to the first assistant to hold, while with a curved needle threaded with moderately fine catgut he stitches each to both pillars of the ring by two sutures on each side, and thus secures the closure of the external abdominal ring and the fixation of the ligament without injuriously strangling the latter structure as it lies between. The assistant can now let go, the chafed ends of the ligaments are cut off, and

the remainder stitched into the wound by means of the sutures that close the incision. A fine drainage tube is inserted, and the wound washed out with carbolic or other lotion before these sutures are tied. I always drain, as I believe it to be so much safer, preventing any collection of pus or danger of interfascial suppuration. It may retard in some cases the healing of the wound, but as I never allow any patients out of bed under three weeks, this is not of much importance.

"Before the dressing is applied in simple cases of retroversion, and a prolapse, I insert a Hodge's pessary and keep it in at least during the convalescence. When there is retroflexion as well, I always insert a galvanic stem to keep the uterus straight during the healing of the wound. An important question with regard to the third stage of the operation is, how far are the ligaments to be pulled out? My reply is, to put the uterus in position and pull out the slack. The after-treatment of the operation consists in rest. The wound I generally dress on the second day, when I remove the tubes, the small aperture left where they were removed being sufficient to maintain the necessary drain in most cases. The ligaments should be allowed time to unite to the wound, to the pillars of the ring, to the canal, and for this purpose three weeks is quite short enough time. Several of my private patients have taken a longer rest, and with benefit, as thus all the pelvic organs have become accustomed to their new position. The rest need not be in bed, a sofa and the sitting posture may vary the monotony of lying in bed, whilst sewing, reading and other feminine arts may be indulged in after the first few days."

In the following operations the course above marked out was closely followed, except that no stem-pessary was used in either case. Emmet's repositor was used in place

of sound, and all patients were kept absolutely in bed for three weeks.

No. I. Mrs. J. Complete retroflexion. An intolerable sufferer from headache, general pains, dispareunia, rectal and vesical tenesmus, cervix torn, uterus four and one-half inches. No pessary would retain uterus in place even after the repair of the cervix.

Operation Sept. 18, 1886. Kept in bed three weeks. Recovery is now complete. Uterus in normal position.

No. II. Miss R. Old retroflexion. Treated unsuccessfully by pessaries for four years. Intense dysmenorrhœa, with scanty menses.

Operation Feb. 16, 1887. Pessary removed May 23. Results so far perfect. Uterus in place and menses easy.

No. III. Mrs. R. Emaciated, severe pelvic pain, cervix torn, uterus retroverted. Pessary failed to keep in place after three months' trial.

Operation Feb. 26, 1887. Pessary removed May 9, 1887. Result perfect, with complete involution of the uterus, although the cervix was not operated upon.

No. IV. Mrs. C. Retroflexion, cervix badly torn, uterus five inches, metrorrhagia, bed-ridden. Pessary failed to keep uterus in place after cervix was repaired.

Operation March 6th, 1877. Pessary removed June 13th. Result perfect as to position and symptoms.

No. V. Mrs. B. Almost constant uterine hemorrhage; cervix torn; uterus four inches; complete retroflexion; entirely unable to work; cervix repaired; uterus still falling over pessary.

Operation March 12th, 1887. Pessary removed May 28, 1887. Result perfect.

No. VI. Mrs. T. Complete retroflexion; ovaries under fundus; great nervous prostration; epigastric pain; uterus elevated but flexion not relieved by pessary; very fleshy subject.

Operation April 22, 1887. Going through two and one-half inches of fat; drainage imperfect; pyæmia; result perfect so far; round ligaments seemed to contract after operation and draw the uterus into more perfect shape than could be obtained at the time of operation.

No. VII. Mrs. P. Bed-ridden, unable to take food, vomiting, constant pelvic pain, dysmenorrhœa, obstinate constipation, rectal tenesmus, cough, great emaciation, uterus retroflexed, ovaries prolapsed and enlarged.

Operation April 15, 1887. Pessary not yet removed; doing part of house-work, appetite and digestion good, gaining flesh and strength rapidly; uterus stays in place when pessary is temporarily removed.

No. VIII. Mrs. G. Uterus completely retroflexed; confined to bed during menses from dysmenorrhœa, accompanied by vomiting.

Operation May 13th, 1887. Case progressing well. Uterus not in perfect position owing to adhesions found during anæthesia. Will require a stem.

In these subjects no repositor is usually needed, for if the pessary be placed before the operation, the proper tension of the ligaments can be ascertained by the finger of the assistant in the vagina pressing the fundus upward. All objections to the operation yet advanced, including immediate stretching of the ligaments, ill-effects in pregnancy, pressure on the bladder, are theoretical rather than practical. There has been already a large experience in the operation, extending over six years and in-

cluding all possible contingencies, and its success is positively assured.

I take great pleasure in appending a part of a letter lately received from Dr. Alexander, expressing his present views upon the operation:

102 BEDFORD ST., S. LIVERPOOL.

DEAR SIR: * * * I still look upon the operation as easy, safe and effectual in suitable cases, and when properly performed. As to your first question, I am just now engaged in looking up my cases, numbering about one hundred, in which I have performed the operation and the analysis of which I have promised to the Intertional Congress, U. S. A. I have not more than one-third of them looked up yet; of these, fully three-fourths are permanent cures in every way; the others failed through adhesions, tubal disease, etc., that I knew to exist before operation, but where I had hoped the placing of the uterus in position might relieve some symptoms and avoid a grave operation. I have no record of results of other operators, but many hundred operations have been performed. Judging from the frequency with which I hear of their performance, the mortality of the operation is nil. I had one death from pyæmia and failure to use a drain early in my experience. Now I never dream of danger, and certainly never meet with any danger.

The failures in retroflexion have arisen, first, from failure to pull out the ligaments sufficiently; second, for want of union of the ligaments and their subsequent retraction; third, from curvature of the uterus and failure to use a stem for a sufficiently long period; fourth, from unyielding adhesions; fifth, from the dead weight of an adherent ovary.

In these cases the uterus became again retroflexed. In other cases the uterus kept straight but the symptoms

persisted. Many of these improve in time, but in others the symptoms are due to tubal, ovarian or neuralgic disease of indefinite seat. All these will be particularized as far as possible in my paper. In simple, complete prolapse, the round ligament operation performed simultaneously with the perineal operation is a most effectual cure of some very deplorable cases. I am very much pleased with this combination so far. I am very sorry that I have no more statistical details to furnish you, but I will endeavor in my paper referred to, to give all details possible.

I remain, dear sir, yours very truly,

WM. ALEXANDER.

OBSTETRICS.

PARK RITCHIE, M. D., CHAIRMAN.

CHAIRMAN'S ADDRESS.

Ladies and Gentlemen:

Instead of the usual chairman's address and stereotyped resume of the general subject, I have determined to make some observations upon that old but ever interesting topic, that ancient conundrum, "How shall we preserve the perineum?"

I shall briefly refer to some methods advocated by authorities and in use by the profession. I have been informed by several individuals that after years of active practice they have never met with the accident of perineal laceration! Such a statement is a confession of ignorance or neglect.

I have industriously used many devices to escape the injury, yet it has occurred in my experience with lamentable frequency. The late Prof. Shroeder reports that in his clinic 34.5 per cent of all primiparæ suffer from lacerated perineum. Olshausen, in his report of the Halle clinic for a period of ten years, states that laceration of the perineum in primiparæ occurs in 21.1 per cent, and in multiparæ in 4.7 per cent. He regards 15 per cent as absolutely unavoidable. This does not include what

Galabin is pleased to call "the inevitable laceration of the fourchette in primiparæ." Does this injury now occur more frequently than in the time of our remote ancestors? Probably not, although Mathews Duncan suggests that "in the Darwinian progress of the species the head of the fœtus has increased more rapidly than the orifice through which it has to come."

Assuming that none will dispute the frequency of the accident, let us look to some of the causes.

General.—Inequality in size between the fœtus and the vulvar ring. The rigid perineum of the primipara, and the hard, unyielding fœtal head, with closed sutures and small fontanelles, would be the most frequent example.

Special Causes.—1st. Precipitate labor. This is best controlled by the use of opiates, chloral, chloroform and the cessation of voluntary efforts. 2d. Misdirected force, so that the tension of the vulvar ring is unequally distributed. As the fœtus descends into the pelvic excavation the perineum opposes its further advance. By extension of the head, the pressure is partly removed from the point of danger, and distributed to the circumference of the ring.

Smellie, nearly 150 years ago, recognized the value of this physiological act, and introduced two fingers into the rectum to aid and enforce it. Goodell's method goes further than this. The thumb is placed upon the caput to delay too rapid advance, with two fingers in the rectum to aid extension, and at the same time pull the perineum forward with each pain, with a view to relaxation. I have often used this device with apparently good results, although Garrignes, of New York, offers the criticism that "the vulvar orifice is a ring, and that a cylindrical body will most readily pass through a ring when the latter is at right angles with the former."

The value of the forceps, as a factor in enforcing extension, is recognized by all. Faulty presentation of the

fœtus, the abuse of ergot, and the unskillful use of instruments are often responsible for injuries. Further comment is unnecessary.

The especial purpose of this paper is to call the attention of the Society to a surgical method, not new but comparatively untried, which I believe most nearly solves the problem, *i. e.*, lateral incisions of the vulvar ring—what is known and described as Episiotomy.

Lusk tells us, "when laceration occurs the vaginal mucous membrane is first to give way, and in a large majority of cases the rupture is in or very near the median line." Galabin says "the laceration in primiparæ extends *to* the perineal body, from *the inevitable laceration of the fourchette.*"

Please to recall the anatomy of the Labia Minora. Two thin folds of mucous membrane, meeting above and forming the prepuce of the clitoris, and being lost in the lower third of the Labia Majora. At the critical moment, when the perineum has become as thin almost as the integument, and the vulvar ring stretched to the fullest degree, the finger will recognize the sharp knife-like edge of the lateral boundary, the Labia Minora. At this stage the so-called "inevitable laceration of the fourchette in primiparæ" takes place, and in a large number of cases the perineal body is torn likewise. If, just before the acme of delivery, one or both labia minora are divided, the dangerous strain is removed from the perineum, it slips over the head, and instead of a ragged, mangled perineal body, we have two trifling wounds, which will heal kindly, because there are no muscular fibres involved to drag the surfaces asunder.

Tarnier says a painful ciatrix is liable to follow the operation, and the vulvo-vaginal gland is often wounded. I have not seen any such result, and do not believe we need fear it. Lusk "damns the operation with faint praise" by saying, "Episiotomy should be performed if laceration

is *inevitable*, but it is the operation of young practitioners."

Mathews Duncan says: "If laceration is inevitable, treatment to prevent it can be of no avail." Commenting upon this remarkable statement, Dr. Manton, of Detroit, in his admirable paper on episiotomy, (to be found in the American Journal of Obstetrics, March, 1885,) says: "How then are we to know if laceration is inevitable? Arguing from the above, the only answer can be: Wait and see! If it tears, it tears! Otherwise no harm is done."

There can be no law indicating when laceration is inevitable. The attending accoucheur must of necessity be the judge. The great bugaboo seems to be, that the operation will be needlessly performed. The same objection obtains against the use of the forceps, or any other obstetric procedure. I do not advocate its indiscriminate use, but when other devices seem inadequate to preserve the integrity of the perineum, we substitute one or two trifling wounds of mucous membrane, for a serious injury of that structure, which is in truth the foundation of the female generative apparatus.

Prof. Crede gives the following analysis of 1000 primiparæ: Lateral incisions were made in 26 per cent. Of these 3 per cent were ruptured in spite of the incisions. Of the remaining 74 per cent who were not incised, over 10 per cent suffered from laceration.

The same eminent teacher shows in another table, that rupture diminishes in proportion to the frequency of the performance of episiotomy. Of five assistants, the one making lateral incision oftenest, had the fewest ruptures, and vice versa.

The surgeon incising in 10 per cent of all his primiparæ had rupture in 21 per cent of the whole number, while the one who incised in 32 per cent had but seven per cent of lacerations.

OPERATION.

Use blunt-pointed bistoury or the scissors. I prefer the latter, because of convenience, ease and quickness of the performance. They can be used without the knowledge of the patient or her friends, which is sometimes a great desideratum. At the moment the vulvar ring is tightly stretched, the finger in the vagina will locate the spot for incision, a little below the center of the labium. Immediately *after* the acme of a pain, make a transverse cut, about half to three fourths of an inch in length, being careful it does not extend through the integument. Repeat upon the opposite side if deemed necessary. Inspection after delivery will show a wound of trifling extent, which may require a suture, although I have never found it needful.

During the past year I have made the operation seven times, all primiparæ. I felt sure in every case that laceration was inevitable, In none of them was there enough injury to require stitching. In none of them was there a painful cicatrix, irritable ulcer, or evidence of septic infection. In the meantime, in two cases where I did not incise, severe rupture took place, requiring the usual operation, with its attending pain and discomfort.

Finally, I can do no better than give you Dr. Manton's conclusions in the article referred to:

1st. The percentage of perineal ruptures is very large.

2d. Episiotomy reduces the frequency of these lacerations to a minimum.

3d. Only in very exceptional cases does rupture take place after episiotomy.

4th. The danger of septic infection is no greater where episiotomy is done than where it is not.

REPORT OF COMMITTEE

— ON —

MEDICAL JURISPRUDENCE.

C. H. BOARDMAN, M. D., ST. PAUL.

According to Spencer, one of the fundamental laws of evolution is that of differentiation, by whose operation the homologous ever tends towards the heterologous. Whatever may be the validity of this postulate as a truth of universal application, it cannot be denied that the practice of medicine and surgery, once a homogeneous system, is rapidly yielding to forces which tend to break it up into more or less distinct departments. But while one organ after another is falling into the hands of special guardians, there are yet certain fields not only not appropriated, but which seem to be scrupulously avoided except upon occasions when necessity compels an unwonted excursion within their limits. Such a field is that of medical jurisprudence. Here and there is found a master of this science, much more often, be it said, within the ranks of medicine than of law, to whom its principles and practice are thoroughly familiar; but to the great majority, both of physicians and attorneys, it is what not many years since the dark continent was to geographers, a *terra incognita*.

Among the numerous chairs of many of our medical colleges is usually to be discerned one bearing the legend "Medical Jurisprudence," and accredited to it some gentleman noted for forensic ability and attainments; but such chairs, for the most part, are silent supporters of the Kantian philosophy, rather than the source of wisdom and instruction, since it would be difficult to discover a stronger proof or a better illustration than they afford of pure idealism.

It is true that mere speculative knowledge can never be substituted for the fruits of experience, whether in this or in any other sphere in which we may be called upon to act; but the inculcation of the principles which underlie a science must always contribute to their intelligent application, and the teaching of the lecture room may well provide a foundation upon which shall subsequently be reared a substantial fabric whose materials experience alone can furnish. That the study of Forensic Medicine should be neglected, however, is to be urged as a reproach not against the medical profession alone; its omission from the legal curriculum is not less apparent to those who have been observant of trials in which the aid of this science was invoked. If by a mastery of it physicians will be better equipped for the role of expert witnesses, it is also true that they will be less frequently embarrassed by clumsy and unscientific questions if more attention were devoted to medical jurisprudence by attorneys. Upon this ground the professions of law and medicine not only meet, but put on, each to a greater or less extent, the panoply of the other. If it is desirable that the medical witness should know something of law, not less important is it that the lawyer should possess some knowledge of medicine; nor is it strange that both, when handling unfamiliar weapons, should display an awkwardness creditable to neither.

We cannot, of course, insist that the members of our

sister profession shall qualify themselves to deal with subjects whose intelligent discussion involves familiarity with psychology, chemisty, physiology and pathology, but we may and should urge that physicians, who are supposed to possess this knowledge, should be so disciplined that it may be effectively used in the court room.

From lack of such training, as well as from faulty observation and the vice of hasty generalization, there are expressed in the course of trials opinions whose bulk and weight bear no due relative proportion: opinions resembling lofty structures erected upon foundations which afford no adequate support, and whose speedy collapse is sure to follow the application of a few well directed questions.

A suit for personal injury was brought not many months ago in this State against a railroad company by one of its employes, he having been caught between two cars while coupling them. The alleged lesion was "injury of the spine," nor could a definite description of its nature and location be obtained during the trial even from the physicians who testified for the plaintiff. One, indeed, thought but would not speak positively, that a contusion had been inflicted upon the lumbar plexus; but the medical witnesses for the most part were conservative, and contented themselves with assuring the jury that a spinal injury of more or less severity had been sustained. What the injury was, where it was, or by what specific indications its existence was recognized, could not be ascertained. The only "expert" for the prosecution who spoke with any degree of confidence appeared to have arrived at a conclusion partly from the statements of the plaintiff, but in large measure also from his own intuitions. When asked whether the presence or absence of the various reflexes had entered as an element into the formation of his opinion, he replied with an air almost contemptuous that he had not thought it worth while to examine the reflexes;

that procedure in a case so obvious was quite superfluous. And yet such an opinion, delivered with the utmost assurance, might impress itself upon a jury and weigh more with them than the well matured belief of another, fortified by scientific reasons and explanations.

During the progress of the trial the counsel for the prosecution, as though apprehensive that the superincumbent weight of ten thousand dollars might prove too much to be carried by the "spinal injury," introduced, one after the other, after the manner of props, additional allegations, to-wit, inflammation of the kidney and some indefinite and elusory damage to the colon.

Suffice it to say that the symptoms described by the prosecuting witness were wholly subjective; there was no evidence further than his own complaints that he had suffered anything more than a spinal wrench or sprain, and this was the conclusion of the jury, who found for the plaintiff in a verdict of nominal damages.

This trial may fairly be taken as a type of those with which our courts are frequently occupied; it is cited, not to call attention to the extent to which trifling or even imaginary injuries are made the basis of litigation, but to illustrate a grave defect upon the part of medical witnesses, which, were it not so common, would probably be viewed with a more marked degree of disfavor than is now visited upon it. No feature of the suit was more noteworthy than the broad and vague generalizations put forth by many of the numerous experts, and the evidences of superficial observation and incomplete examination which were apparent in the testimony of a still larger number. Cursory and hurried examination of the plaintiff afforded ground for the expression of belief in the gravity of the injury and for a gloomy prognosis; isolated symptoms pointed unmistakably to lesions whose existence can be rationally inferred only from a group of symptoms: the spinal cord, or rather, as it was termed for the most

part, the spine, became Pandora's box with open lid, whose evil contents, a long catalogue, had emerged to prey upon the sufferer, and in which not even hope itself had been retained; the electrical soundness of muscles was established by their response to a brief and superficial application of a Faradic current of unknown strength, whose employment was unattended with any nice precautions against error, nor was any attempt made to ascertain the presence or absence of the reaction of degeneration. The list might be enlarged, but enough, perhaps, has been said to indicate the lack both of careful observation and systematic training which is so often displayed by physicians when called upon to testify as experts.

In Faraday's famous lecture upon the education of the judgment may be found weighty counsels whose adoption would minimize, if it should not remove, much of the discredit which now attaches to our reputation as witnesses. For example: "As a result of this wholesome mental condition we should be able to form *a proportionate judgment.* The mind naturally desires to settle upon one thing or another; to rest upon an affirmative or a negative; and that with a degree of absolutism which is irrational and improper. In drawing a conclusion, it is very difficult, but none the less necessary, to make it proportionate to the evidence; except where certainty exists (a case of rare occurrence) we should consider our decisions as probable only. The probability may appear very great, so that in affairs of the world we often accept such as certainty, and trust our welfare or our lives upon it. Still, only an uneducated mind will confound probability with certainty, especially when it encounters a contrary conclusion drawn by another from like data. This suspension in degree of judgment will not make a man less active in life, or his conclusions less certain as truths; on the contrary, I believe him to be the more

ready for the right amount and direction of action on any emergency, and am sure his conclusions and statements will carry more weight in the world than those of the incautious man." And again: "The education which I advocate will require *patience* and *labor of thought* in every exercise tending to improve the judgment. It matters not on what subject a person's mind is occupied; he should engage in it with the conviction that it will require mental labor. A powerful mind will be able to draw a conclusion more readily and more correctly than one of moderate character, but both will surpass themselves if they make an earnest, careful investigation, instead of a careless or prejudiced one; an education for this purpose is more necessary for the latter, because the man of less ability may, through it, raise his rank and amend his position. I earnestly urge this point of self-education, for I believe it to be more or less in the power of every man greatly to improve his judgment. I do not think that one has the complete capacity for judgment which another is naturally without. I am of opinion that all may judge, and that we only need to declare on every side the conviction that mental education is wanting, and lead men to see that through it they hold, in a large degree, their welfare and their character in their own hands to cause in future years an abundant development of right judgment in every class."

These passages emphasize by implication one of the most fruitful causes of our blunders and shortcomings when called upon to assume the functions of interpreters to a jury. It may be said that the difficulty inheres in human nature, and that responsibility for the offense therefore should not be laid at the door of our training; but while such a demurrer would be sustained as regards the original existence of the evil, a true bill must be found against methods of education which, if they do not foster superficial views and crude and hasty conclusions, at least

include no systematic attempt to correct them. The teaching of our schools as now constituted is largely didactic, and more reliance must be placed upon self-culture than upon magisterial exhortations; and for that reason it is much to be desired that our undergraduates might enjoy the advantage of a training which should not only insist upon the rough examination and accurate observation as the basis of sound conclusions, but should enforce these teachings by lessons and illustrations drawn from the courts. It is easy to form and express an opinion, but not always easy to maintain it by intelligent reasoning, and if the members of our profession were accustomed to arrive at conclusions by a process whose successive steps should survive the ordeal of a rigid cross-examination, we should become both better expert witnesses and better physicians.

Such a scheme is by no means utopian; it is not supposed that all students will become equally proficient in this more than in any other department, nor that there would not be some, even after graduation, whose opinions would continue to be only wild conjectures; but a course of lectures, such as is suggested by this paper, would at least be a step in advance, and if combined, as it should be, with practical instruction in the methods of the courts and the conduct of trials, there can be no reasonable doubt that the result would prove to be both creditable to ourselves and beneficial to the community. In other words, the art as well as the science of medical jurisprudence, should be taught in our schools; the science, that the fundamental principles, at least, which govern and control the procedures of courts may be comprehended, and the art that these principles may be intelligently applied so far as may devolve upon us as experts. In a trial which occurred some years ago in this city a very slender acquaintance with the rules of evidence would have averted from a medical witness a stern reprimand

from the court, and an injunction to be careful that so gross a violation of propriety as well as of the rules of law should not be repeated. Let our schools see to it that this hiatus in their curriculum be filled, and that a more complete equipment be furnished our students against emergencies which otherwise will be certain to find them unprepared.

It was hoped that the late revision of the criminal code of this State would include a provision that when the allegation of insanity becomes a defense, that issue shall be first tried by a medical commission to be appointed by the court; and if the defense be set aside, the case shall then go to the jury on its merits. It is said, however, by those who are in a position to speak with authority, that some such enactment, if not precisely this, will probably be adopted by the next legislature.

In conclusion, by the kind permission of Dr. Hunter, of Minneapolis, a report is herewith presented of the suit so unjustly brought against him a year ago. It is offered solely upon the ground that all physicians are personally interested in every such case, since each one is exposed to danger from a similar source, and may find in such reports material that may serve a useful purpose for protection or defense. In connnection with this subject, is it not the part of wisdom that we should endeavor, both as individuals and as a Society, to secure the passage of an act which shall require the plaintiff in suits for malpractice to give bonds which shall make him responsible for the costs in case of an adverse decision. Such a law is found upon the statute books of some States, and would prove an effectual deterrent from many of the suits which are now brought purely as speculations.

It will not be regarded as out of keeping with the character of this paper if it be made the occasion and the medium of expressing to Dr. Hunter the hearty congratulations of the Society and the assurance of their sincere

gratification that in the case of Hobein vs. Hunter the jury was sufficiently enlightened to find for the defendant.

Henry Hobein, aged 40; blonde, of fair intelligence; first consulted me in July of 1884. He stated that he had already consulted several physicians. He was greatly depressed over the recent loss of wife and child and worried about his own condition. He cried considerably. He complained of an intolerable itching and burning in the rectum and about the anus, of pain on defecation, of pain in the head of the penis and smarting along the urethra on urination. He was also suffering from stomach dyspepsia. His temperature was 100° F.

The anus and lower bowel were red, sensitive, and presenting a very slight crack in the mucous membrane. The urine showed some prostatic shreds, some pus and blood corpuscles. A No. 10 steel sound passed readily into the bladder, but caused a good deal of pain in the prostatic portion.

The treatment adopted was constitutional, such as would improve the condition of the alimentary canal; and locally the passage of the cold sound, washing of the prostatic portions with astringent solutions by means of the prostatic catheter and an anodyne ointment for the rectum. He denied ever having had a gonorrhœa, though admitting illicit intercourse; claimed an injury to the perineum from a fall while in the army. No improvement following, the patient was examined for stricture with the bulbous bougie. The hospital record reads: "A No. 15 Am. passes in five and one-half inches, a No. 12 Am. passes into the bladder, disclosing a narrowing one and one-half inches in length, beginning five and one-half inches from end of penis." The patient was advised to enter the hospital and have both the stricture and the anal orifice dilated. The nature of the trouble and the purpose of the operations were fully explained and understood by the patient.

He entered the hospital in August. The operations were performed under ether, without anything notable occurring. There was little reaction. Sounds were passed from the fourth day on, with a good deal of pain at first.

The patient was sometimes better, sometimes worse, always melancholic. After six weeks he left the hospital, complaining still of rectal and urethral symptoms, but on the whole better than when he entered. He went to work.

I saw him a few times at the office and passed the sound, No. 18 Am., easily. I saw nothing more of him till winter, when he came with a note from Dr. Kimball asking for a consultation. He did not complain of urethral or of rectal symptoms, but of symptoms referable to the digestive tract. Said he had been doctoring ever since fall with various physicians; cried some; expressed himself satisfied with my previous efforts, and paid me cheerfully. I wrote a note to Dr. Kimball, in which I spoke of Mr. Hobein as an hypochondriac. This letter he afterwards read. The next week he came to my office, burst into tears, and charged me with deceiving him, experimenting upon him, aud a number of other wicked things.

The suit was soon after brought. The complaint alleged injury to rectum; that there never was a stricture of the urethra, and that the useless treatment by operation had caused permanent enlargement of the same.

On the stand he denied ever having given me specimens of urine for examination; denied having had any particular urinary symptoms. When asked from whom he first learned that his urethra had been injured, he said "From Dr. Myers." (Dr. Myers I have never met, either socially or professionally.) To the question, "In what condition did Dr. Myers say he found your urethra?" he replied, "Dr. Myers said it had been permanently enlarged by the operation." All the doctors called by the plaintiff, four in number, including Dr. Myers himself, testi-

fied to having examined the urethra with nothing other than a No. 8 catheter, either before or since the operation.

The testimony of Dr. Myers was objected to by defendant's counsel. The objection was overruled. Counsel said he should ask for an order from the court for an examination of the plaintiff's urethra by a committee of experts. Dr. Myers then testified that he found the urethra of the plaintiff "perfectly natural and normal."

My own testimony and that of Dr. French, who was present and assisted at the opertion, established the presence of the stricture, upon the actuality of which the whole case depended, as the allegation about injury to the rectum was not dwelt upon by the prosecution. The jury was out but a few minutes, and returned a verdict in favor of the defendant.

Mr. Hobein felt no ill-will towards me before my indiscreet diagnosis of his mental condition as that of an hypochondriac. This ill-feeling was sedulously cultivated by an impecunious and misguided attorney, aided and abetted by a disaffected brother practitioner.

MATERIA MEDICA.

THE HYPODERMIC SYRINGE IN RELATION TO MICRO-ORGANISMS.

J. E. FINCH, M. D., HASTINGS.

Although the use of the hypodermic syringe has been greatly extended since its introduction into therapeutics by Wood, still, perhaps not less than ninety per cent of all the instances in which it is now employed are for the purpose of injecting morphia sulphate *per se*, or in combination with atropia or strychnia. For this reason, and others given below, morphia will be the only drug alluded to in this article.

As a last forlorn hope of relief from a severe brachial neuralgia, the writer reluctantly resorted to Erb's treatment of injecting minute portions of morphia close to the affected nerve in the "painful points." The effect was magical. Relief was complete and almost instantaneous; and, after suffering a little short of torture for nearly a whole year, the boon can never be described.

But ere long it was found necessary to increase the dose, and now it became a serious question to choose between the remedy and the complaint; but while thus debating an extra twinge generally decided the question in favor of the morphia.

In course of time it was discovered that the same dose of the drug, used apparently under the same circumstances but at different times, produced, both locally and constitutionally, effects so notably dissimilar as to demand an investigation. Accordingly a drop of the solution about to be injected was placed on a slide and put under the microscope. I was amazed and horrified; then delighted by the revelation. And now I resolved to utilize my misfortune for the benefit, mayhap, of some of my less unfortunate professional brethren, or perhaps I should say for the benefit of their patients.

The foregoing brief statement of facts seems necessary as a kind of preface to the following, and will serve to explain certain implied or expressed experimentation which otherwise might appear like inexcusable rashness if not downright foolhardiness.

I propose to discuss briefly (1) the morphia, (2) the menstruum, (3) the instrument, particularly in their relation to certain microscopic organisms, many of which seem to be quite innocent when taken into the stomach and submitted to the action of the gastric secretions, but are entirely different things when introduced subcutaneously; and (4) the effect of these organisms, when thus introduced, on the human organism so far as I have been successful in tracing it.

Morphia sulphate, usually spoken of simply as morphia, and which is about the only form of morphine administered hypodermically, seems to have some peculiar attraction for certain species of microphyta. It may be doubted, I think, whether a sample of this drug ever leaves the hands of the manufacturer entirely free of them, and when the package has been opened and the morphia exposed to the air, especially in the warm season, they generally increase very rapidly.

The most troublesome, and, I think, the most dangerous of these organisms is a protophyte or unicellular algæ

varying in diameter from 1-600 to 1-1200 of an inch. Either this or some form of penicillium, although the latter as a rule is less deleterious, is almost invariably present in morphia that has been exposod to the air for any length of time. Hence the freshly prepared solution is far from being so pure as many physicians seem to think.

Moreover, if a drop of the fresh solution, such as is usually prepared for injection, be immediately placed under the microscope and kept under observation a few minutes it may generally be noticed that peculiar organisms (fig. 1) will begin to develop in it within twenty to thirty seconds. This is less time than is usually employed in preliminaries between the preparation of the solution and its injection. Hence the importance of making use of the solution as soon as possible after its preparation.

We frequently hear of unexpected and sometimes alarming phenomena following the injection of what was supposed to be a small portion of pure morphia. I am convinced that in a great majority of such instances the preternatural effects are not, as is generally believed, simply the action of the morphia on an idiosyncratic subject, but are the specific effects of the extrageneous bodies alluded to *supra*.

How, then, shall the morphia be kept so that it may be free of microphyte when its immediate use is required? I have long since given up all hope of keeping it in solution; and the so-called "Hypodermic Tablets," although exceedingly convenient, are unfit for the use intended. I have seldom or never failed to detect some form of micro-organisms in these tablets when subjecting them to an examination.

In short, I know of but one way to treat the drug successfully, and that is to keep it in bottles, air-tight, from which the air has been expelled by heat. This treatment also effectually destroys all germs and microphyta that may have already found a way into the morphia. A few

half drachm vials containing one-eighth to one-fourth of a grain of the drug will answer all purposes. They may be heated over a common lamp, care being observed not to scorch or decompose the morphia. If a portion of the water of crystalization be expelled all the better. The anodyne or hypnotic properties of the drug will not be perceptibly injured thereby, while its solubility will be increased, a decided advantage under many circumstances.

But purity of the menstruum is, perhaps, of equal importance, although many practitioners seem to consider it of no importance whatever.

Not many months ago one of these gentlemen having occasion to use the hypodermic syringe on his patient, called for water, but on turning around, he discovered a goblet partly filled with lemonade, and, countermanding his order for water, proceeded to dissolve the morphia in lemonade. The injection of this solution was speedily followed by inflammation, and the formation of a tumor half the size of a hen's egg. A week or more thereafter our doctor was much surprised on accidentally discovering considerable swelling and discoloration still remaining where the morphia had been inserted, and exclaimed, "Goodness gracious! That shows what poor circulation you had."

The physician who can promptly and to the satisfaction of all concerned, explain such unexpected phenomena so as to turn them to his own pecuniary advantage is certainly, "in his way," something of a genius. This patient did not recover his normal circulation for many weeks.

That distinguished therapeutist, Prof. Bartholow, in speaking of the menstruum, says: "Solutions prepared from ordinary spring or rain water are found to produce less inflammation and are less liable to be followed by abscess than those prepared with pure distilled water which has been kept for several days." I have never

seen inflammation or abscess follow this operation when it has been carefully performed and all impurities excluded, nothing more than slight redness extending a line, more or less, from the point of puncture, which, in an hour or two, has completely disappeared. And, my observations have been made in every part of the country from Manitoba to the Gulf of Mexico, from Massachusetts to Utah, and at all altitudes from sea-level to thirteen thousand feet above sea-level.

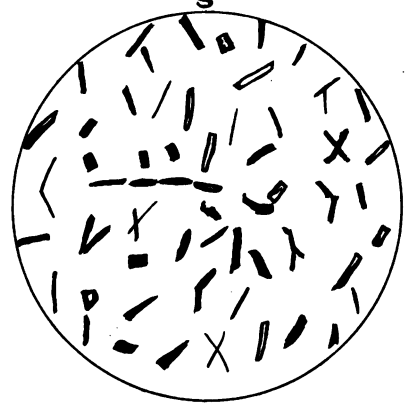
Ordinary well water from which surface water has been carefully excluded is, as a rule, the best, but of course should first be properly filtered.

But however carefully depurated and sterilized the morphia and menstruum may have been, it is "labor lost" unless the instrument be also thoroughly cleansed and sterilized. Penicillium and the protophyte mentioned above will develop in and around the moist piston in a remarkably short time after use, especially if the smallest portion of morphia solution remains in the instrument; and they cannot be dislodged without repeated washings. By washing the syringe directly after using it in a ten per cent solution of Squibb's test solution of iron chloride its purity may be maintained almost indefinitely.

But the most interesting question connected with this subject, while it is the most difficult of satisfactory solution, is that which relates to the effect on the human organism when these micro-organisms are injected hypodermically. I will not deny that my courage has at times been sorely tried after examining a preparation designed for experimentation, and nothing short of an absolute knowledge that physicians are continually employing similar preparations therapeutically could have induced me to continue the experiments.

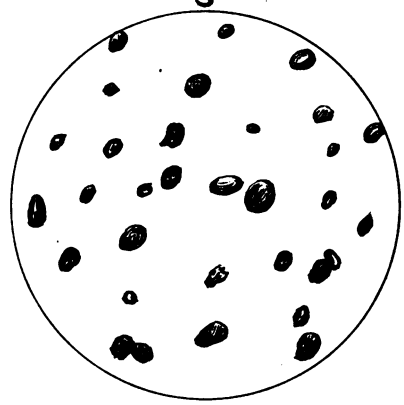
The limits of this article, however, will not permit me to do more than allude very briefly to a few of the more interesting facts that have been elicited by this inquiry.

Fig. 1



Bacilli in Morphia Solution.

Fig. 2.



Protophyte.

Locally the operation never fails to produce considerable swelling and inflammation. Some of the organisms thus introduced are prone to follow the lymphatics, and, within a few seconds, may be traced along the course of these vessels to the distance of several inches from the point of insertion. At the same time the physiological action of the morphia is profoundly modified, and to a certain extent antagonized, so much so that any one at all familiar with the effects can, within a few minutes after its injection, distinguish between the pure and impure drug.

But the constitutional morbific effects are felt first by the nervous centres. A sense of fullness and constriction, accompanied with a dull, sometimes severe pain in the head; a feeling of general malaise, occasionally slight chills followed by mild febrile reaction. These phenomena begin to develop within ten to twenty minutes, and usually pass off in a few hours if there be no repetition of the dose. They are doubtless the result of a direct morbific action on the nervous elements, particularly those of the vaso-motor centres.

But the daily injection of the protophyte (fig. 2), even in very small numbers, is soon followed by a marked diminution of the red and a corresponding increase of the white corpuscles of the blood. Whether this results from a premature death or a retarded development of the red corpuscles, I am not prepared to say.

That these organisms either multiply with great rapidity or generate some specific morbid material with wonderful activity after their introduction into the system we have, I think, the most convincing proof, but I have not as yet been able to detect them in the blood.

They are at first eliminated through the bowels, and so long as this emunctory continues in normal activity they may be thus drained off and attenuated so that their specific morbid effects may not be felt for a length of time. But, on the other hand, their accumulation in the

system is soon followed by a series of morbid phenomena resembling very closely a single, or perhaps a double quotidian ague, the sweating stage of which is generally extremely severe; and that a portion at least of the materia morbosa is eliminated periodically with this profuse perspiration I have no doubt, although, for reasons which I think will be readily inferred, I have not been able to prove this by direct observation.

Many years ago, when the malarial poison was almost universally believed to be a gaseous emanation, I combatted this view in an article published in the *Northwestern Medical and Surgical Journal*, and I there stated my belief that the malaria of intermittent fever is a vegetable organism, and I classed it with the unicellular algæ. I now believe that I have since seen with the natural eye, aided by the microscope, what I then saw with the mental eye alone.

Although I do not think that the protophyte whose morbid effects are described above is the true malarial organism, still I have reason to believe that it is a near relation of it. I cannot believe that the "bacillus malariæ" of Tibbs and Tommasi Crudelli is the malaria of intermittent fever. This subject, however, as well as all observations relating to other species, especially the bacilli, I must leave for future discussion, as the intended limits of this article are already exceeded.

In conclusion, I think there is reason to believe that the microphyta, or microzoa, whatever be their mode of introduction into the human organism, do not directly as such produce their most pernicious effects, but that in many instances, at least, the morbid material or poison that develops the specific disease with which they are severally associated is a secondary product resulting from their evolution or metamorphosis, or from disturbed metabolic processes in the subject.

Moreover, many facts connected with this inquiry go

far, I think, towards proving that, as a rule, these micro-organisms are incapable of doing serious mischief until the soil, so to speak, is prepared for their reception and development; that is to say, until the vitality or resistant power of the appropriate organ or tissue has been lowered so as to present an avenue or a nidus for their encroachment. Hence an explanation of C. T. Williams' experiments in the hospital for consumptives at Brompton, in which the air of the wards seemed to be loaded with bacilli without seriously affecting the attendants. These experiments I have verified repeatedly under a variety of circumstances.

A FEW PRACTICAL NOTES ON THE USES OF SALICYLATE OF AMMONIA, APOMORPHINE, AND SODIO-SALICYLATE OF CAFFEINE.

BY OSCAR ALF. FLIESBURG, M. D., HUDSON, WIS.

First.—Salicylate of Ammonia. This salt has for the last three or four years received some attention from the therapeutist, and deservedly so. My object in this short paper is to bring out a few practical notes on its use, especially in the febrile diseases of the lungs and air passages. I shall not speak about the theories why this ammonium salt should be employed and given preference over any other salts of ammonia, nor why it should be given preference over any other salts of salicylic acid in these particular diseases; the reason is simply a "*raison d'etre.*" I will here only cite the remarks made by Dr. J. R. Barnett, of Neenah, Wis., in a paper read before the Wisconsin

State Medical Society at their meeting in Madison, Wis., last year, and afterwards appearing in the Journal of the Am. Medical Ass'n, page 654.

He says, in speaking about the ammonium treatment, typhoid fever: "But I also ventured upon a radical departure from the outset. I also reasoned that the rational remedy must be *ammonium salicylate* for reasons which need be only alluded to. Its germicidal properties, possessed in common by all salicylates, and its antipyretic and antiseptic powers, would at least give promise of effectiveness in modifying, if not aborting the course of fever. It would certainly avail in hyper-pyrexia; it ought to fortify against systemic contaminations, from intestinal ulcerations; and whether or not it were to be decomposed in the body and thus produce a nascent *carbonate*, it should, in common with all ammonium compounds, serve as a stimulant, which could be strengthened at will by addition of ammonia in excess."

I coincide entirely with Dr. Barnett in the first part of the citate, but I beg to differ with him in the formation of a nascent *carbonate* through the decomposition of the salicylate. Inasmuch as M. Albert Robin has shown that the salicylic and benzoic acids and their compounds when administered combine with some nitrogenous substances, such as for instance *glycocal*, and are then reduced to *salicyluric* and *hippuric* acids, which in that state are eliminated by the kidneys, and as such compounds found in the urine. But be this as it may, the fact stands undisputed and proven that we, in *salicylate of ammonia*, possess a sure remedy to reduce temperature, and which, by its antiseptic and germicidal properties, is able to abort and shorten the course of the *zymotic* diseases. For some years past I have been in the habit of prescribing salicylic acid in the treatment of pneumonia, both of the lobar and lobular forms; also in the treatment of bronchitis, both of the *capillary* and

simple forms, and also to some extent in typhoid fever, but still more in fevers of the *puerperium*, and never have I had reason to regret this, my departure from the trodden road. Formerly I always employed either the pure *acid* or the sodium compound. In the last two years I have always employed the salicylate of ammonium as the preferable compound in these fevers, leaving the sodium and potassium compounds to fevers of a rheumatic type.

In a paper read before the Interstate Medical Society, at their last meeting in Eau Claire the 9th of March, 1887, I spoke about the *salicylate* of ammonia and apomorphine in the treatment of pneumonia, bronchitis, and especially of membraneous croup, in the following words: "I now bring forwards the salicylate of ammonia and apomorphine for their intrinsic value, not only as expectorants and reducers of temperature, but also for their constitutional and antiseptic effects, and still more as solvents for fibrin and sero-fibrin. If M. Albert Robin's theory on fevers is correct, then we cannot find in the whole range of antipyretics a more efficient heat reducer than *ammonium salicylate*."

The formula I have employed has been one part *salicylic acid* to two parts of *clear carbonate of ammonia*, dissolved in water. This leaves an excess of free *carbonate*, but I have not considered this a drawback. I have always thus employed it in a *nascent* state. The doses I have employed have been from 5–10 ctgrmes. (0.05–0.10) to an infant, to 1.00 (grammes) or more to an adult, to be repeated, as need be, every hour or two. I have with those doses been able to reduce temperature in remarkably short time from 105° or 106° to 99° or 100°, and by repeated doses with longer and longer intervals to keep the fever down at that point. At the same time my cases have progressed without much other medication to a favorable end, in a shorter time and with less distress to the patients than by older methods.

I have very little inclination to cite cases, and will only state that I have for the last year used the salicylate of ammonia in every case of *pneumonia*, *lobar* or *lobular*, *bronchitis* and *suffocation*, *catarrh*, and also in *membraneous croup*, which I have met during the year in children, and in nearly all cases in the adult, and always with the same result, a short, uninterrupted course of the disease for the better from the beginning of the exhibition of the drug until the end of the inflammatory processes. Furthermore, I cannot speak highly enough of its use. My time is at present too limited to prepare an elaborate paper on the subject, and I heartily hope that these few words will suffice to induce some of you gentlemen present to use this preparation in your practice, and that you will be as pleased with its exhibition as I have been.

Second.—Apomorphine. We all know, and the most of us have some time or other used this therapeutical agent for its emetic effects; but, gentlemen, it is not as a revolutionizer of the stomach or as an emesis producer that I now wish to occupy your time to speak about *apomorphine*. No, gentlemen, I want to call your attention to this valuable drug in its capacity as an *expectorant*. For the last three years I have employed apomorphine in every case of capillary bronchitis (acute suffocative catarrh) and membraneous croup (acute local laryngeal diphtheria) I have met. I must have used it upwards of 150 times. Whenever I have met with a case of *suffocative catarrh or croup* I have always and invariably prescribed alternately *ammonium salicylate* in mixture and powders of *apomorphine*. The dose of the latter has ranged according to age of patient, from 1 *mgm.* (0.001) to 3 *mgms.* (0.003), or 1-64 to 1-20 of a grain, every one, two or three hours, as case and urgency has called for its use. I have always found it act very favorably—first, producing an easy expectoration of the thick, tenacious phlegm which otherwise so often strangles and chokes the unfor-

tunate little sufferers in their futile endeavors to rid themselves from this sticky adherent stuff; second, it produces a watery exudation or exosmosis in the bronchioles and bronchi, which again thins the tenacious phlegm and in this manner makes it easy for the little sufferer to raise the otherwise murdering substance; third, by producing this transudation it bathes the inflamed surfaces or membranes with a non-irritating liquid; fourth, carries away the surplus of blood from the arterioles, by compressing the lumen of the same, and by so doing gives the inflamed surfaces a chance to recover from their hyperæmic state. This is, so far as I have been able to note the effects, the *modus operandi* of the drug.

The literature on apomorphine as an expectorant seems to be remarkably scant. I do not know of anyone that has recommended its use as an expectorant with sufficient data to insure its free use as such. With the exception of Wertner, and lately Rossbach, of Germany, none seem to have used it in this capacity at all. Rossbach has lately recommended its use in chronic bronchitis, in combination with morphine, but only in adults. Rossbach and Nothnagel say that it has been recommended by Jurasz in bronchial affections. Bartholow speaks of it, only that it has been used for bronchial troubles, but with not sufficient data to insure its safety. Stille and Maisch say that it may be used in chronic laryngeal troubles. Wood, in his Therapeutics, Materia Medica and Toxicology, says to be sure that it has been commended as an expectorant by Jurasz, and that his observations are confirmed by others, and among others by Dr. Wertner, who indeed seems to be the only one who has sufficiently used it in this capacity, and in his observations has found the identical effects which I claimed and do claim for it, namely: 1st. In the early stage, in a few days, or even sooner, to change the thick, viscid mucus into a thin, easily raised fluid. 2d. To quiet the excessive coughing,

by either acting as an anodyne and hypnotic—a theory which I hold it does—or simply by relieving the great irritation by bathing the membranes with a non-irritating exudation.

While I then confirm his observations, I must toll a warning bell against the excessive doses recommended, not only in Wood's Therapeutics, but also in Rossbach's and Nothnagel's, and said to be employed by Wertner and Jurasz. He (Wood) gives the dose as 1-14 to 1-7 grain (0.07–0.15 grain) every two hours, and double the amount to an adult. In my opinion these are indeed very dangerous doses, and cannot but bring the remedy into disrepute on account of the very depressant symptoms, bordering on collapse, that must necessarily follow. The largest doses I have ever employed have been 3 mgms. (0.003) or 1-20 of grain to a child four years old. It was given every two hours, and I afterwards thought that the depressing symptoms were somewhat alarming, and that I would not use it again in so large doses. Still, I am sure I have found the same effects which Dr. Wertner claims for it. I cannot, therefore, warn you enough not to use too large doses of this drug, which I value so highly and which I am positive can do so much for our little sufferers in cases of need,—thereby bringing the remedy in disrepute and oblivion.

The diseases in which I have found it most useful are *suffocative catarrh* or *capillary bronchitis* and *membranous croup*. In my paper read before the Interstate Medical Society I have more fully dealt with its use in croup, and as I hope to have this paper read before this Society I humbly refer you to it for more fully detailed accounts of its use.

Third.—Sometime in 1885 my attention was called to *sodio-salicylate of caffeine* in a German journal. Soon after I saw it mentioned in the American Druggist. It struck me at once that this combination between sodium-

salicylate and caffeine should or ought to be particularly useful in some cases of heart disease, for instance in endo- and pericarditis of a rheumatic type, or in pericarditis with effusion, or in inflammatory or acute endocarditis. I therefore had a druggist of this city (Mr. Johnson) prepare a sample for me. Although I never feel inclined to recite cases, I shall here for the nonce do so.

Case I. Mary K., servant, 16 years. Chlorotic, anæmic, strumous, endocarditis rheumatica, following subacute rheumatism of ankles and wrists, for which she had taken salicylic acid and salicine in combination with digitalis and nux vomica. Rheumatic trouble better, but no improvement of heart symptoms. I had also been giving her tr. ferri chloridi. Put her on sodi-salicylate of caffeine 0.15 (15 ctgm.) four times a day. Steady improvement from beginning of exhibition of drug; well in fourteen days. Heart sounds and murmurs normal; no friction sound. I at same time gave her for chlorosis Pil. Blaudii.

Case II. J. McD., aged 36; millwright. Endo- and pericarditis rheumatica. Had a subacute attack of inflammatory rheumatism in winter which left him with this complication. Put him on 0.20 (20 ctgm.) doses of the drug four times a day. Steady improvement from beginning of this treatment. Heart normal in twelve days. No other treatment.

Case III. Mrs. P., aged 32. Chronic endocarditis, pericarditis, aortic and mitral insufficiency. Congestion of left lung from pressure, anæmia. Gave her 0.10 (10 ctgm.) sodio-salicylate caffeine four to six times a day, also "extr. convallariæ majalis flor. fluid," 5 m. three times a day. Some improvement during treatment, but it was not continued on account of patient going to Chicago, and there having an acute attack, came under Prof. N. S. Davis' treatment.

Case IV. Mrs. T., Scandinavian, aged 33. Uterine troubles, neuralgia migraine, pain over pericardia. Has had unbearable pains over heart and in head, frontal and on top of head. Sodio-salicylate caffeine, in 0.20, was given three times a day when migraine was severe, otherwise twice a day, morning and night. Steady improvement since exhibition of drug.

These are a few cases I have notes upon. I have prescribed it some more times, but have no notes on the effect. Of course those cases are entirely too few to form an opinion from. Still, the results have been such as to encourage a further trial of the preparation. I can most heartily recommend it so far.

The mode of preparing it is not very complicated, and I append the formula I have been using, making the percentage of caffeine 50 per cent. The Germans seem to use not only this double salt, but also the double salts of cinnamic and benzoic and cinnamic acids, and these can be prepared in the same manner as the salicylic salts, only to substitute the respective acids.

Take of caffeine, pure,	50 parts (grammes).	
salicylic acid,	32 "	
hydrate soda,	qu. s.	
distilled water,	"	
salicylate of soda,	"	to make 100 parts.

Heat the caffeine with about 600.00 of water, add the salicylic acid, then add the solution of caustic soda till nearly neutralized. Leave it slightly acid; it is well to preserve a portion of the acid solution, so if the remainder should be alkaline it can be corrected; evaporate the neutral solution on a water bath to a granular salt, pulverize, and then add enough salicylate of soda to make the whole weigh 100 parts (grammes) by weight.

MEDICAL EDUCATION.

THE PRESENT EDUCATIONAL STATUS OF THE MEDICAL PROFESSION IN THE UNITED STATES.

BY R. O. BEARD, M. D., MINNEAPOLIS.

Mr. President, Ladies and Gentlemen of the State Medical Society:

Since the days when the old Greeks offered their libations to the Goddess Hygeia in the temples of Esculapius, the medical profession, among all civilized peoples, has enjoyed the position of a privileged class. It has been exempt, in large measure, alike from military service and from civic duty. It has been permitted to subsist as a consuming while a non-producing element of the body politic. It has been accorded a high social status upon the basis of its supposedly inherent claims to the recognition of society. It has fallen heir, in conditional perpetuity,—and not without some show of reason,—to a large measure of that traditional reverence which was formerly conceded of right and now is granted of courtesy to a superior rank.

And why? Surely there is value in this conveyance of privilege; what is the consideration which the trust deed

implies? Wherein lies the security of its perpetual descent? The answer to each of these queries is to be found, I think, in a single fact.

The medical profession of our forefathers, whether ancient or modern, was looked upon not only as a class but as a *cultus*. It was believed to be in the possession of special fitness and peculiar powers. It was supposably endowed with a degree of intellectual light far superior to that which illumined the darkened mind of the masses. In the childhood of civilization this special fitness was suspected to be of supernatural origin, and these peculiar powers to have descended in a mystic line. In later days both the one and the other were understood to be the products of human culture, but that culture was as far removed from popular ken as if it had been the fabled legacy of some propitious god.

And these beliefs, like most articles of human faith, had a large basis of truth. In earlier times the intellectual chasm which lay between the people and the medical profession was very wide. However crude his art, however embryonic his science, the healer in every community was a marked man. His culture, relatively to general education, was large. Paracelsus beside of Billroth was an ignoramus, but he looms up as a giant among the intellectual pigmies of his day. Hippocrates and Galen were but the wet nurses of infant medicine, but they not only ruled its nursery during their own lifetime: they laid down, in advance of their age, those principles which were to govern it throughout a large part of the period of its youth. The country practitioner of the last century would sit in wide-eyed wonder at the feet of our medical student of to-day, even though the latter's name be legion, yet *he* could walk his native heath in the pride of a conscious superiority which his modern teacher would find it hard to muster, and in command of a measure of popular veneration which, until he shall have been decimated

many times by the tests of professional competency, our average student will never win.

So long as education remained an undiscovered country to the masses, and the lamps of scientific truth were held high above the heads of the people in the hands of a chosen few, the relatively exalted position of the medical fraternity was an undeniable fact. In company with the parson and the squire, the doctor occupied his place of undisputed privilege as a representative of the learned professions. For a time, the distance between him and his patients widened by so much as the progress that he made. Whatever the sum of its qualitative and quantitative conditions, he stood to society as the possessor and purveyor of medical truth.

But there came a time when this relative supremacy was to be shaken. With the crisis of the French Revolution and the birth of the American Republic, the movement toward the mental as well as the political emancipation of the masses began to be strongly felt. Like the leaven of the parable, it was not long before its influence had become visible throughout the whole social fabric. "The crystals of life had been disturbed, and henceforth they would rest upon new facets." With the invention of appliances which revolutionized labor, with the introduction of the railway, the steamship, the fast mail service, the telegraph—agencies which gave such mighty impetus to "the thoughts which shake mankind"—it was inevitable either that the onward march of the popular mind must be actively shared by the profession of medicine, so that the comparative distance should be maintained between itself and the people, or that public intelligence must begin to overtake the doctor. It is, no doubt, cause for wonder that the medical profession, as a whole, should have been blind to the altered conditions surrounding it, but it certainly is historically true that it failed to get the signs of the time into their true perspective. While there

were a few great leaders of medical science in that day, as in every other, who not only grasped the meaning of the present but gazed as well into the future, it would seem that the many were more occupied with the attempt to shovel sand under the shifting foundations of their social supremacy, than with any endeavor to rebuild the structure upon the firmer rock of progressive truth. For medical knowledge was, like everything else of this remarkable period, wonderfully progressive. "The dark territories of Pathology offered a fine America to the young student" of the first and second quarters of our century. The researches of Bichat, the invention of Laennec, the study of comparative physiology and morbid anatomy, the discovery of Jenner, the introduction of anæsthetics, and a host of other improved methods of practice, were destined to appear one by one to dig deep the grave of empiric medicine and to set the bases of medical science.

But these very facts simply emphasized the misfortune of the profession of that day. Popular education was becoming easier; medical culture was growing more difficult to attain. The practitioner of the period found it hard to keep proportionate pace with the general advance of the people. He consoled himself with the belief that his calling was a closed book to the public mind. He failed to see that, ignorant as it was, his clientele was beginning to catch up with him; that his pseudo-science would no longer do current service; that his empirics would not stand new tests; that the "post and propter" principle was already being applied to his treatment, and that the doctor, in his entirety, was the subject of new scrutiny. He found no laws upon the statute-book to compel the conditions of his training, and he easily drifted to the rear in this new era of his calling.

That this disturbance of the old, authoritative relations of the profession to the people was actual, the briefest

view of the literature of the time will suffice to prove. George Eliot, picturing the medical England of 1829, says: "This was a dark period. * * * The profession wanted reform. In spite of venerable colleges which used great efforts to secure purity of knowledge by making it scarce, it happened that many very ignorant young gentlemen were promoted in town and many more got a legal right to practice over large areas in the country. The high standards held up to the public mind did not hinder quackery from having an excellent time of it; for since professional practice chiefly consisted in giving a great many drugs, the public inferred that it might be better off with more drugs still, if they could only be got cheaply, and hence swallowed large cubic measures of physic prescribed by unscrupulous ignorance which had taken no degrees."

While class legislation is one of the reproaches of paternal governments, it is true, at the same time, that the latter are more actively protective of the people from the abuses of a special class. It was not long, therefore, before the leading powers of the old world took cognizance of the evils which were springing up in the medical profession, and each enacted laws to suppress quackery and licensed ignorance, to determine to qualifications for medical practice and to settle the essentials of medical training. The established universities became the natural media for the conveyance of professional instruction, and it was soon apparent, in the altered tone and character of the physician and the higher estimate in which he again began to be held by the people, that the observance of sufficient standards of education had restored the balance of superior knowledge between the profession and the public.

In the United States an effort was early made to follow in the footsteps of foreign example. Laws were passed in several States which were intended to be restrictive of

ignorance and to insure sound medical education. It appears, however, that these measures, unbacked by that public sentiment which, in the absence of a paternal government, was necessary to enforce them, were soon repealed or died of disuse. Dr. J. H. Rauch, of Illinois, whose statistical reports have been valuable in the collection of many of the following facts, tells us that by 1830 there were practically no legal restrictions upon medical practice or education in this country. The profession threw wide open its doors to an army of would-be practitioners. It let down the bars of qualification and went into close competition with every form of ignorance and quackery. It was not long before the invitation thus extended was accepted on all hands. Hundreds of youth were caught by the glamour of a professional career, easy to be attained and affording good prospective profits. While medical learning went into decline, medical teaching received a new impetus. The influx of students served, in its turn, as a strong temptation to that spirit of commercialism which is at once the glory and the curse of our American civilization, and which began to beset the learned profession of medicine in the United States. If the demand for medical instruction was active, the supply was brisk. Medical colleges were rapidly created. A mushroom growth of professorships sprang up. If youth was, and still is, susceptible to the attractive prospect of a cheap professional name, maturity and old age proved then, and even now, to be readily seduced by the allurement of an equally cheap professional title. To this day the number of lecturers whose names serve as bobs to the kite-tail of a college is supposed to determine very largely the weight of its announcements and the dignity and worth of the institution.

Is it the love of teaching, or the ardent desire to elevate the standards of medical education, which leads these hundreds of professional men to flock to the faculties of

the schools, until Chicago and Minneapolis alike, to say nothing of older cities, have one professor to every five or six M. D.'s who are undignified with "a chair?" Or—pardon the offensiveness of the query—is it the interest upon their invested stocks, which so few realize, or the titular advertisement which they are confident to gain, which draws so many professional wealth-seekers to the gold fields of medical instruction? Do not many of these cases demand a new definition of that convenient and elastic shibboleth of our guild, "unprofessional conduct?" Would it not be as well to pause in our prosecution of the advertising quack, whose real injury to the profession is of very mote-like magnitude, to take cognizance of the damage to our calling which is daily done by this "beam in our own eye?"

But to return. The medical professor predicates the medical school, nor are we "putting the cart before the horse" when we discuss the former first. For the college usually stands in relation of effect to the teachers as a cause. Within a period of eighty or ninety years 238 medical schools have come into existence in these United States. Providentially, a few of these have been too defective in their organization to survive more than a few years. A still rarer few have been too educational in their methods to sustain the brunt of competition with inferior schools conducted upon a purely business basis. So largely, too, has the supply of colleges exceeded even the immense demand for cheap diplomas, that 120 of these institutions have become extinct, while some 118 still survive.

The extinction of so large a number of schools, many of them veritable diploma-mills, is in part due to a revival of interest in medical education which dates back some ten or twelve years. It goes without saying that before that time individuals were concerned for the future of the medical profession in America, whilst here and there a

college, manned by such enthusiasts, put itself into the front rank of educational reform. It was largely due to the efforts of these few men that the initial steps toward the passage of restrictive legislation were taken.

Prior to 1874 but one State, North Carolina, had a law in operation regulating the practice of medicine. This was passed in 1859, and is far in advance of the majority of the acts which have followed in other States. In 1874 Kentucky passed a medical act, creating district boards of examiners, but it has been more conspicuous for its breach than its observance. In 1875 Nevada legislated upon the subject. In 1876 California and Texas followed suit. A year later Alabama created her state and county boards of examiners, and Illinois enacted the law which has been in operation up to the present time. In 1879 Kansas took similar action, and New York followed her in 1880. In 1881 ten other States and Territories came into line with similar bills, and the next year seven more commonwealths did likewise. In 1883 four States, including Minnesota, adopted like laws with the rest. In 1884 Dakota and Virginia legislated, and in 1885 Iowa and Indiana.

Idaho, Maine, Maryland, Massachusetts, Montana, Ohio, Oregon, Rhode Island, Tennessee, Utah and Washington Territory have no laws whatever upon this subject. Vermont has a sort of discretionary law existing as a fragmentary part of her Revised Statutes. Illinois has, at the present time, upon its passage in the legislature, an act which is a slight improvement upon the law of 1877, in so far as it increases penalties and fees and defines a college in "good standing."

All of the above laws, with the exception of those of Alabama, Mississippi, North Carolina and Virginia, are identical in their general features. They create state boards of examiners or censors, whose duty it is (1) to pass upon the good standing of colleges whose diplomas

are presented to them; (2) to issue, upon acceptance of the diploma, a license to practice medicine in the State; and (3) to examine, in default of a recognized diploma, the candidates for their certificate.

Of the exceptional States I have noted, Alabama has state and county boards of medical examiners. All applicants for license to practice are submitted to examination; diploma-holders by the county boards and non-graduates by the State Board. The Alabama act has one unique feature which deserves mention. Persons desiring to study medicine in the State must first present themselves to a county board and pass a preliminary examination in English grammar, literature, history, arithmetic, geometry, inorganic chemistry and physics. Mississippi, also, requires the examination by its State Board of graduates and non-graduates alike. To the North Carolina law I have already referred as being the oldest of all medical acts. It has the same features as those I have last mentioned, but its standard of successful examination is only 66⅔ per cent. Its usefulness has been attested by the fact North Carolina has less than half the number of physicians to be found upon the average in other States. Virginia has a similar law, but requires a standard of 75 per cent in its State examinations. It has been in operation less than two years. To the new Minnesota medical act, which goes into force July 1st, I shall presently have occasion to refer.

The passage of most of these laws during the past decade is of value chiefly as an indication of the new birth and growth in this country of a sentiment which is in favor of medical reform. The contribution which they have in themselves made to this reform is as yet small. At the most they would seem to have favored the extinction of some fraudulent and inferior schools, and to have influenced, to some extent, an improvement in the curriculum of others. That such an advance has been made is indis-

putable. The average duration of the college term has been slightly lengthened; a three years' course of collegiate study is required or provided for in an increased number of schools, and preliminary qualifications, of however low an order, are insisted upon by a somewhat larger proportion of our medical institutions. Much stress has been laid, in some quarters, upon the beneficial influence of the definition of the "good standing" of a college which has emanated from certain of our State Boards of Health, but since the schedule of collegiate requirements laid down by these bodies is nothing more than the average qualifications of all legitimate colleges of medicine, it is difficult to see how the standards of medical education have been elevated thereby.

The available facts, then, which bear upon the present educational status of the medical profession in the United States may be briefly summarized. Of the 118 colleges in existence at the close of the last year, 102 nominally exact preliminary educational qualifications from their matriculants. I say *nominally*, for it is needless to remark that in a large number of instances the printed announcement conveys the only demand which is ever made upon the would-be student for a practical observance of this essential rule. The "qualifications," when they are actually required, vary within wide limits. A college or high-school diploma, and a teacher's certificate—instruments which are often of very doubtful value—are always accepted in lieu of preliminary examination. When the latter is imposed, it means anything from the slenderest evidence of a very elementary ability to read, write and spell—a fact which the final examination-papers of a majority of our medical graduates will amply emphasize—up to a careful test, made in rare instances, of the applicant's acquaintance with English studies, arithmetic, history, elementary chemistry and physics. Of mechanics, the practical handmaid of surgery, or of Latin and Greek,

the derivative bases of medical nomenclature, even the printed announcements of the medical colleges have seldom anything to say.

To pass on to the requirements for the receipt of a diploma, we find that, of our 118 colleges, 29 require and 48 others recommend a three-years' collegiate course. This is, in some cases, accompanied by a demand for evidence of four years of study. In the rest, a two-years' course of lectures, with three years of study, renders the candidate eligible for graduation, and it needs no demonstration to this audience that in very few of the colleges which issue a catalogue of superior requirements is an applicant of two years' lecture-room experience ever denied his diploma. Rarely is any mention made of clinical attendance, hospital observation or midwifery practice to the aspirant for a degree. The diligence of the student may supplement these collegiate deficiencies, but perhaps I shall not be over bold if I assert that not one in five of our graduates in medicine has earned his parchment by so much as the conduct of a single labor, by the successful bedside diagnosis of disease, or by the correct inditement of a dozen compatible prescriptions. An institution in Florida, which is, I believe, still in existence, publicly announces its possession of "an outfit consisting of a human skeleton and of dissected preparations, such," it suggests, "as will make the labors of the dissecting room less disagreable." With the obnoxious features of this appartment our average student is fortunately familiar, but how many a one can tell the story of cadavers in too limited abundance to enable him to dissect his "three parts?"

The small measure of medical reform we have yet compassed, while it has diminished the number of our diploma mills, has not materially lessened the army of our matriculants or the number of our diplomas, and the proportion of the latter to the former has not noticeably de-

creased. During the five years ending with the spring of 1886, our colleges entered 58,714 matriculants and graduated no less than 19,917 of this number. The year 1880 had rather more than its average share of these students, and the succeeding four years witnessed therefore a slight diminution as compared with that date. Adding a fair average for the unascertained figures of 1887, which certainly do not fall short of that point, we have in the past six years 70,457 matriculants and 23,900 doctors developed therefrom. The proportion of graduates to matriculants is, therefore, about 33 per cent, and in no year of this period has it materially changed. The maximum percentage in a single State is 49.5, the minimum 21.3; the maximum for an individual college is 56.2, and the minimum 20.9.

Evidently the retrogressive tendency of medical education has been checked by the effort at reform, but we have not yet arrived at a point where we can record any markedly progressive steps. We cannot better realize the urgency of our present position than by holding ourselves up to the mirror of comparison with other nations.

Canada, in proportion to her population, has as many colleges of medicine as have we, but while we, in the course of the century, have witnessed the extinction of a greater number of institutions than we now possess, she, out of a total of fifteen, has found occasion for the sacrifice of but three. The sum of her matriculants was 4,336, and of her graduates 820, during the period from 1881 to 1886, while we were matriculating over 58,000 and graduating nearly 20,000. The percentage of her graduates to her matriculants is 18.4, beside of our average of 33 per cent. Great Britain, the German, Austrian and Russian Empires, the French Republic and the Kingdoms of Italy and of Norway and Sweden, have, in toto, with their population of nearly three hundred millions, about one-half the number of medical colleges which the United States, with its

fifty to sixty millions, can boast. The city of Chicago has more medical institutions than all Austro-Hungary contains, while the State of Minnesota has half as many, or about one-fourth of the number which supply the entire medical instruction of the great German Empire. The General Medical Council of Great Britain accepts the qualifications of twenty-one universities and colleges, while our State Boards are likely to be presented with the diplomas of 118 schools.

Compare, too, the curricula which are prescribed by law in these foreign institutions with the course required in our own. In Canadian and British colleges nothing less than a university degree in arts or science stands in lieu of a preliminary examination, and the subjects of the latter are English, Latin, higher mathematics, statics, hydrostatics and mechanics, with a choice of other optional branches. In the Dominion, four years of medical study, with four years' courses of lectures, covering six or nine months each, are required, unless the student holds a degree in arts, which is taken as an equivalent of one year of lectures. In Great Britain five years of lectures are demanded instead of four, with the same allowance of one year to the holder of a degree in arts. This period of study secures to the successful graduate the degree of M. B., while to obtain the degree of M. D. he must add from one to three courses of additional lectures. In Germany eight semestres, or four years, of college attendance, and in Austria ten semestres, or five years, constitute the necessary period of medical education. A similar time must be spent by French students in the schools. In all of these countries the qualifications for a diploma include not less than two years of actual attendance upon the hospital and out-door clinics, and not less than six cases of midwifery. Their final examinations cover a period of weeks, and even months, rather than days.

After all due allowance has been made for the vaunted

energy and superior perceptive powers of the American mind, there remains a vast difference between medical education at home and abroad—a difference which is startlingly emphasized when we turn to the respective registers of practicing physicians. In the Kingdom of Sweden one medical man is found to every 7,000 people. In Italy they have one physician to every 3,500 persons; in Germany, one to about 3,000 of the population; in Austro-Hugary, one to 2,400; in France, one to a little less than 2,000 people; in Canada, one to every 1,100; in the *United States, one to every 520 persons.* In the last United States census year (1880) 83,436 practicing physicians were entered. Since that time the number of graduates who have carried away their degrees from our colleges swell the total to nearly 111,000. These figures make no account of deaths or the abandonment of practice since 1880, nor, on the other hand, do they entertain the advent of physicians from foreign shores. Making ample allowance for a possible subtraction as the sum of these sources of variation, we discover the fact that the physicians of the United States are multiplying at the rate of five per cent per annum, while the population of the country at large is increasing at the rate of less than two per cent. In grotesque contrast with these statistics is the concern which is expressed by the London Lancet because the British Medical Register, which includes physicians in the naval and marine service and many practitioners in the dependent colonies, as well as all the licensed physicians in the United Kingdom, shows an increase of 2,679 in ten years.

Such, then, is the uncolored picture of the educational status of the medical profession in America to-day. Viewed in the most judicial temper, it should arouse a sense of shame in the mind of every honest American physician, as it has a sentiment of ridicule in the minds of our foreign brethren. Taken at its best, it must silence the

shallow arguments of the *laissez faire* school of thinkers, who are content to let the problem solve itself, to see the individual fittest survive, and the profession work out its own salvation or damnation in the mass.

The consequences of this depraved status of medical education have made and are making themselves painfully manifest upon the profession. It is indeed a telling tribute to the genius of our American people that our guild has been able to maintain itself so well as it has in the face of the agencies which have been thus at work, for so long a period, to compass its demoralization. But, in spite of that national genius, the effects upon our calling are marked. A disastrous spirit of commercialism and competition has crept into its ranks. The over-crowding of the profession has made it very difficult to avoid the tendency to jostle each other. The standards of professional courtesy have been lowered, and like the Pharisees of old, while we maintain the letter of our ethies we outrage, too often, the spirit of the law. Our business relations with the public have depreciated with the exigencies of close competition. In the eyes of society, the physician has forfeited much of the public prestige—the position of privilege—which, in other times and among other peoples, he has been entitled to enjoy. And, along with it all, it must be admitted that the prejudicial influence of these educational evils has been felt in a decadence of the spirit of scientific research in America. To how small a circle has the real work of medical and surgical progress, the investigation of physiologic and pathologic truth, been abandoned! Where are the masters of our new continental schools, or the American counterparts of their noteworthy "assistants" of the European present, the western analogues of the "pupils" of the great oracle of the Salpetriere? Greatly as we have excelled in inventive skill applied to medicine and surgery, where are the discoveries in pathology and

physiology of American fame that will rank with those of Simpson, of Bernard, of Virchow, of Koch, or of Pasteur?

Yet the fraternity may congratulate itself that a strong reaction in the direction of medical reform in America has set in. The best elements in the profession are moving for its protection, and it is not too much to hope that a new era for medical education and medical science has begun.

In what manner and by what means is this reform to be urged? Two avenues of effort seem to be open to individual and corporate endeavor. One of these is in the direction of the medical college itself; the other is in the direction of improved medical laws. Hitherto the American Medical College has been a by-word among foreign schools. To this day the Royal Colleges of Great Britain recognize but five or six of our degrees. And yet nothing is needed but an appreciative effort, upon the part of the profession, to put our schools upon a plane with the highest and best equipped institutions of the Old World. The John Hopkins University is already endowed to that end, and it will not be long, unless others follow rapidly in its wake, before it will be the goal of the progressive medical student of our land. Endowment is the key-note of our greatest educational need; endowment either from the State, after the manner of our State University grants, or from private sources of private institutions. It is satisfactory to note the steps that have been taken in this direction in the way of testamentary bequests to some of our best schools. The special objects of these endowments should be: (1) The equipment of laboratories devoted to physiologic, chemical and pathologic research, and, (2) the establishment of salaried professorships in charge of these laboratories, and filling the most important collegiate chairs. The most salutary effect of this plan would be the death or abandonment of stock companies as medical institutions. It is a distinct menace to

the cause of higher medical education that professors in our colleges should be permitted to hold a financial interest in the corporation for which they teach—an interest which is constantly a temptation to the forfeiture of the educational welfare of their charge. The financial policy of such an institution should be entirely divorced from its educational policy, or the latter will inevitably, under existing conditions, become subservient to the latter.

With regard to the qualifications of the student, a recent writer in the London Lancet has well said that the chiefest secret of medical education is the general, rather than the special, culture of the pupil. The most important requirement that a preceptor or a college can impose upon a student is the preliminary test of his fitness for professional life and study. The portals of the profession should be jealously guarded from those who are physically, morally or mentally incapacitated for the fulfillment of its functions. Yet we have seen in college seats men who were to deaf to hear a syllable that fell from the lips of the professor, men who were notably offensive in their moral life, and men who could neither write legibly, spell correctly, nor answer a question with ordinary intelligence. It is to be hoped that not many of these have been permitted to graduate, even in our most irresponsible days, but it may be feared that there are still colleges which will let them through. A primary knowledge of the classics, mathematics, mechanics and physics, to say nothing of English branches, is indispensable to the educational equipment of the medical man. And lastly, while small fault is to be found with our theoretical courses of medical teaching, it must be insisted that practical training is the subject of common neglect. Clinical instruction, bedside diagnosis, midwifery attendance, and actual class demonstrations of the healthy and diseased tissues, are most necessary factors in the making of the future physician.

But, however devoutly these things are to be desired, the ideal American medical institution is not yet! At the present time, whatever they may become in the near future, the medical colleges, as a whole, are actually obstructive of medical reform. It is essential that restricted legislation should be enacted to meet the immediate conditions of need. The majority of our existing laws have not proved themselves equal to the emergency, in that they have demanded nothing beyond the college diploma and have but timidly, in their execution, gone back of that instrument. The law is required to supplement not to endorse the diploma, to practically verify the attainments of its possessor rather than to inquire into the merits of its possession. The profession and the public can only be efficiently protected by medical acts which will limit the over-production of the medical man and determine his fitness for the responsible position in the community to which he aspires. Commenting upon the Illinois law now in force, ex-Lieutenant Governor Hamilton, of that State, recently said: Primarily, the object of the law was to rid the State of incompetent, ignorant and dangerous mountebanks and quacks. *Incidentally*, it was designed to require a reasonable amount of education to fit the individual for the practice of medicine. But His Excellency took hold of the wrong horn of the dilemma. The "incident" is the prime factor in the result of such legislation. Elevate medical education, make professional ignorance impossible, prescribe the conditions of suitable preparation for the practice of medicine, and the profession will, in the course of a few years, take care of itself, while the quack will exist only as a member of a criminal class. Public sentiment is ready for the enforcement of such restrictive legislation. It devolves upon the profession to initiate it. The obstructionists to its passage are in our own ranks. The difficulty in purifying our professional Israel comes from the presence of the hidden shekels of many Achans in the camp!

Minnesota has stepped to the front rank of the States in this matter of medical legislation. By the enactment of her new law she has put the profession under the highest legal protection it has yet enjoyed, and for the accomplishment of this notable end the State is largely indebted to the efforts of the secretary of the old board of examiners, Dr. P. H. Millard, of Stillwater. By the provisions of this law it will henceforward be impossible for any medical practitioner, be he graduate or non-graduate, to enter this State and engage in practice without having first submitted himself to an examination before the new state board. It remains with that board to so carry out the principles which underlie these provisions that incompetency cannot come in and inflict itself upon society, and that quackery, whether diplomaed or not, cannot thrive.

But one step more could be taken in this happy direction, and even this may eventually prove to be desirable, viz., the withdrawal of the diploma conferring power from the hands of the colleges. The course toward improvement which these institutions may or may not take must ultimately determine this consideration.

In conclusion, let me offer a suggestion that may be worthy of future thought. In the cause of professional advancement and the maintenance of the public health, has not this country a useful place to be filled by a national department or bureau of public medicine and medical education, and might not our State societies, taking this suggestion under their wise consideration, fitly move toward the attainment of such a project? Each and all of these various movements toward reform subserve a common end and share a common purpose—the restoration of the medical profession to the position of social influence, of liberal culture, of scientific progress and of public privilege, which is its rightful but conditional heritage.

NECROLOGY.

A. B. STUART, M. D.

Dr. A. B. Stuart, of Santa Rosa, California, died on the 30th day of July, 1887, of paralysis, aged 57 years.

Dr. Stuart was born at Williamsburg, Pa., on the 27th day of August, 1830. He was educated at Lewisburg University, Pennsylvania, and entered upon the study of medicine at Berkshire Medical College, Pittsfield, Mass., from which institution he was graduated M. D. in November, 1856, having filled the position of demonstrator of anatomy in that college previous to graduation. He located in practice at West Hampton, Mass., but in 1858 removed to Macomb, Ill., where he was engaged in the duties of his profession until the early part of August, 1861, when he entered the army as Asst. Surgeon 10th Mo. Infy. Vols. In the autumn of 1861, while assisting in the hasty construction of a fort, he was caught between some timbers and sustained an injury producing partial paralysis, from the effects of which he never entirely recovered. He was on duty with his regiment during the siege of Corinth and the campaign of the spring of 1862, but owing to severe illness he was sent north in July of that year. In August he returned to his command, and was present at the battles of Iuka and Corinth in September and October. Shortly after these engagements the Confederate wounded, numbering over three thousand, were, according to the terms of a cartel, placed in hospital

at Iuka, Miss., under the immediate care of their own surgeons, and Dr. Stuart was detailed by Gen. Rosecrans and directed to assume the superintendence of those hospitals on behalf of the United States. He remained in this position until the hospital was discontinued, in March, 1863.

In April, 1863, he was commissioned surgeon of the First Regt. Ala. Cav. Vols. (white). He remained in active service with that regiment until January, 1864, when, owing to continued ill-health, he tendered his resignation, which was accepted, and he returned north. Some months later he resumed private practice at Macomb, Ill.

In the winter of 1865–6 he attended the regular session of Bellevue Hospital Medical College, New York, receiving an ad eundem degree from that college in March, 1866. The following June he came to Minnesota and established an office in Winona, where he was engaged in general practice until July 1st, 1876, when he determined to seek a climate better adapted to his impaired health. With this end in view he visited California, and for some years was located at Santa Barbara.

In 1880 he removed to Santa Rosa, Sonoma County, which point he selected as a permanent residence. He soon acquired a lucrative practice, to which he gave his attention to the last days of his life. During the spring and early summer of 1887 he suffered from occasional seizures of local paralysis, the effects of which partially disappeared. On the 30th day of July he was prostrated by a severe attack of general paralysis, from which he never rallied, death occurring in the evening of that day.

Dr. Stuart assisted in the organization of the Winona County Medical Society, and was president of the society in 1872. He was a member of the Massachusetts Medical Society, of the Minnesota Medical Society from its organization (holding the office of vice president in 1874

and 1876), of the California Medical Society and of the American Medical Association.

He served as a delegate from the Minnesota Society to the meeting of the International Medical Congress, which was held in Philadelphia in 1876. He was largely instrumental in securing the establishment of the State Board of Health of Minnesota, and was elected president of said board at its organization in 1872.

Dr. Stuart, notwithstanding a feeble physical constitution and the vicissitudes attendant upon almost constant ill-health, succeeded in accomplishing a large amount of work in his professional career by virtue of the perseverance, earnest effort and indomitable energy which were manifested in all his undertakings. The later years of his life were saddened by great afflictions arising from the loss of his children. His last bereavement, the death of his daughter Mary, a lovely child twelve years of age, which occurred in 1883, was to him a sorrow unrelieved by the lapse of time. Of his immediate family his widow alone remains, but near the scenes of his childhood an aged father mourns the loss of a most devoted son.

DANIEL LEASURE, M. D.

On the evening of the fourth of October, 1886, at his residence in St. Paul, after a brief illness, died Dr. Daniel Leasure in the 68th year of his age.

Dr. Leasure was born in Westmoreland County, Pennsylvania, his ancestry reaching back on the maternal side of the house to the Scottish covenanters, and on the paternal remotely to the Huguenots of Navarre.

He graduated in medicine from Jefferson College, Philadelphia, in 1846, and began the practice of his profession in Darlington, Pennsylvania, but in 1849 he re-

moved to New Castle, Pennsylvania, where he continued until the breaking out of the War of the Rebellion.

Almost from boyhood the subject of this notice had shown a predilection for military affairs, and when President Lincoln's first proclamation calling for troops appeared, Dr. Leasure gave up the practice of medicine and became a soldier as Colonel of the famous 100th (Roundhead) Pennsylvania Regiment. He served with distinction throughout the war, and retired brevetted Brigadier General.

After the close of the war he resumed the practice of medicine in New Castle, continuing to reside there until 1870, when he again changed his field of labor to Allegheny City. In 1878, owing to failing health, he decided upon another change of residence, and came to St. Paul. Here Dr. Leasure soon acquired a lucrative practice, and won the respect of his confreres and the affection of his clientele.

Dr. Leasure always during his residence in Minnesota took a lively interest in, and an active part, in the work of the State Medical Society. He was lecturer on Materia Medica and Therapeutics in the St. Paul Medical College.

Presidents of the Society.

SAMUEL WILLEY,	1869–1871
FRANKLIN STAPLES,	1871–1872
W. W. MAYO,	1872–1873
W. W. SWEENEY,	1873–1874
N. B. HILL,	1874–1875
J. H. STEWART,	1875–1876
F. H. MILLIGAN,	1876–1877
OTIS AYER,	1877–1878
J. E. FINCH,	1878–1879
A. C. WEDGE,	1879–1880
A. J. STONE,	1880–1881
C. N. HEWITT,	1881–1882
P. H. MILLARD,	1882–1883
W. L. LINCOLN,	1883–1884
J. B. McGAUGHEY,	1884–1885
E. J. DAVIS,	1885–1886
H. H. KIMBALL,	1886–1887
C. F. McCOMB,	1887–1888

ROSTER.

The *italicised* names are those of members elected in 1887.

A. W. Abbott, Minneapolis.
E. J. Abbott, St. Paul.
E. D. Abell, Shakopee.
C. P. Adams, Hastings.
W. T. Adams, Lake City.
J. C. Adams, Lake City.
Wm. Alden, Tower.
A. G. Aldrich, Anoka.
Frank Allport, Minneapolis.
A. B. Ancker, St. Paul.
J. W. Andrews, Mankato.
Clara E. Atkinson, St. Paul.
Alcinda Auten, St. Paul.
Otis Ayer, Le Sueur.
J. F. Baker, St. Paul.
R. D. Barber, Worthington.
C. K. Bartlett, St. Peter.
G. C. Barton, Minneapolis.
Geo. F. Bates, Minneapolis.
C. E. Bean, St. Paul.
R. O. Beard, Minneapolis.
J. Bedient, Kasson.
W. L. Beebe, St. Cloud.
J. W. Bell, Minneapolis.
Carl Bendeke, Minneapolis.
Chas. Berry, New Ulm.
E. E. Bigelow, Owatona.
D. P. Bigger, Brainerd.
F. E. Bissell, Litchfield.
F. A. Blackmer, Albert Lea.
A. Blitz, Minneapolis.
G. S. Brigham, St. Cloud.
C. H. Boardman, St. Paul.
E. Bolink, St. Paul.
J. E. Bowers, Rochester.
H. M. Bracken, Minneapolis.
Anson R. Brackett, Minneapolis.
D. F. Brooks, Minneiska.
E. J. Brown, Minneapolis.
A. M. Brunelle, Minneapolis.
F. R. Burnham, St. Paul.
W. J. Byrnes, Minneapolis.
J. L. Camp, Brainerd.
W. H. Carruthers, St. Paul.
A. B. Cates, Minneapolis,
T. J. Catlin, Delano.
J. W. Chamberlain, St. Paul.
O. S. Chapman, Minneapolis.
E. Y. Chilton, Howard Lake.
C. N. Clarke, St. Charles.
Ida Clarke, Rochester.
T. C. Clarke, Stillwater.
J. C. Cockburne, Minneapolis.
H. B. Cogswell, St. Paul.
J. M. Cole, Winona.
J. B. Cole, Minneiska.
E. E. Collins, Duluth.
D. T. Collins, Minneapolis.
A. T. Conley, Cannon Falls.
H. E. Conley, Waterville.
D. M. Cool, Faribault.
C. O. Cooley, Madelia.
H. L. Coon, Northfield.
Geo. M. Coon, Northfield.
R. O. Craig, Janesville.
F. J. Cressy, Granite Falls.
C. A. Cromett, Wadena.
E. W. Cross, Rochester.
D. S. Cummings, Waseca.
A. W. Daniels, St. Peter.
C. E. Dampier, Crookston,
E. J. Davis, Mankato.
Wm. Davis, St. Paul.
G. W. Davis, Duluth.
David Day, St. Paul.
W. W. Day, St. Paul.
William Deegan, White Bear Lake.
F. Dedolph, St. Paul.
Le Grand N. Denslow, St. Paul.
Godfrey Deziel, Minneapolis.
L. P. Dodge, Farmington.
Frank A. Dodge, Le Sueur.
Wm. Dodge, Le Sueur.
Charles Dolan, Waterville.
J. W. Donnell, Minneapolis.
J. H. Dorsey, Glencoe.
J. A. Dubois, Sauk Centre.
W. T. Duncan, Fergus Falls.
J. H. Dunn, Minneapolis.
John B. Dunn, Shakopee.
D. C. Durham, Anoka.
F. A. Dunsmoor, Minneapolis.
Peter J. Dwyer, St. Paul.
J. J. Eklund, Duluth.

G. W. Emery, Minneapolis.
C. A. Entrup, Shakopee.
W. C. Eustis, Farmington.
O. J. Evans, Minneapolis.
Thos. H. Evarts, Minneapolis
A. C. Fairbairn, Minneapolis.
C. M. Ferro, Tracy.
J. E. Finch, Hastings.
E. A. Fischer, Long Prairie.
J. C. Fitch, Hastings.
S. D. Flagg, St. Paul.
C. L. Flannagan, Minneapolis.
Oscar Alf Fliesburg, Stillwater.
W. D. Flinn, Redwood Falls.
J. F. Force, Heron Lake.
G. F. French, Minneapolis.
Edward S. Frost, Willmar.
J. F. Fulton, St. Paul.
W. W. Furber, Cottage Grove.
J. R. M. Gaskill, Marine Mills.
E. S. Gibbs, Monticello.
A. W. Giddings, Anoka.
A. O. Gillman, St. Cloud.
A. J. Golden, Minneapolis.
B. F. Graham, Minneapolis.
Wm. Greaves, Northfield.
C. A. Green, Windom.
H. L. Green, Minneapolis.
C. Gronwald, Norway.
H. C. Grover, Rushford.
A. F. Groves, Brainerd.
A. Guernon, Little Falls.
Willis R. Hallowell, St. Paul.
Wm. H. Hallowell, Minneapolis.
E. W. Hammes, New Trier.
S. F. Hance, Minneapolis.
D. W. Hand, St. Paul.
P. Sprague Haskell, St. Paul.
H. J. Harding, Minneapolis.
A. W. Hedderly, Minneapolis.
P. A. Heitz, Hastings.
C. N. Hewitt, Red Wing.
G. A. Hewitt, St. Paul.
Charles Hill, Pine Island.
H. S. Hill, North Springfield, Mo.
R. J. Hill, Minneapolis.
E. A. Holmes, Oronoco.
Mary G. Hood, Minneapolis.
H. F. Hoyt, St. Paul.
J. P. Humes, Winnebago City.
D. W. Hunt, Durand, Wis.
A. W. Hunt, Minneapolis.
W. A. Hunt, Northfield.
Fred N. Hunt, Fairmont.
C. H. Hunter, Minneapolis.
E. A. Hutchins, Minneapolis.
T. J. Hutton, Fergus Falls.
L. D. Jackson, Grand Meadow.
Bruno Jaenig, Red Wing.
J. H. James, St. Peter.
H. D. Jenckes, Sauk Rapids.
Wm. Jenner, Stillwater.
H. P. Johnson, Houston.
J. P. Johnson, Blooming Prairie.
T. H. Johnson, St. Paul.
Philo E. Jones, Red Wing.
Talbot Jones, St. Paul.
W. A. Jones, Minneapolis.
C. R. J. Kellum, Heron Lake.
Edward D. Keyes, Winona.
V. P. Kennedy, Litchfield.
J. T. Kietsinger, Minneapolis.
H. H. Kimball, Minneapolis.
J. M. Kistler, Minneapolis.
G. H. Knight, Faribault.
H. L. Knight, Le Roy.
J. R. Kinney, Minneapolis.
J. Koehl, Minneapolis.
John Kurtz, Moorhead.
N. C. Lane, Ortonville.
N. S. Lane, Eyota.
W. S. Laton, Minneapolis.
H. E. Latz, Minneapolis.
George Leininger, Red Wing.
W. L. Lincoln, Wabasha.
A. H. Lindley, Minneapolis.
Q. A. Lowe, Wabasha.
C. E. Lundgren, St. Paul.
A. MacDonald, St. Paul.
J. W. MacDonald, Minneapolis.
J. A. MacDonald, Chaska.
W. H. Magie, Duluth.
George E. Maloy, Glencoe.
T. T. Mann, St. Paul.
T. M. Marcellus, Sleepy Eye.
J. C. Markoe, St. Paul.
J. H. Martindale, Minneapolis.
W. W. Mayo, Rochester.
W. J. Mayo, Rochester.
B. J. Merrill, Stillwater.
G. F. Merritt, St. Peter.
C. A. McCullum, Dassel.
C. F. McComb, Duluth.
S. C. McCormick, Duluth.
Thomas McDavitt, Winona.
S. W. McEwan, Alexandria.
J. B. McGaughey, Winona.
John McLean, Moorhead.
H. L. McKinstry, Zumbrota.
W. R. McMahan, Mankato.
O. H. McMichael, Vernon Centre.
R. S. McMurdy, Minneapolis.
M. Mikkelsen, Delevan.
P. H. Millard, Stillwater.
F. H. Milligan, Wabasha.
Lester C. Mitchell, Minneapolis.
J. B. Moffett, Minneapolis.
G. R. Maloney, Belle Plaine.

T. H. Monahan, Minneapolis.
R. L. Moore, Spring Valley.
J. T. Moore, Minneapolis.
J. E. Moore, Minneapolis.
F. S. Muckey, Minneapolis.
A. Mueller, New Ulm.
J. F. Mulholland, Jordan.
L. H. Munger, Clearwater.
A. J. Murdock, Minneapolis.
J. H. Murphy, St. Paul.
Garrett Murphy, Garden City.
William Newhall, Red Wing.
Geo. W. Nichols, Merriam Park.
A. K. Norton, Detroit.
Elizabeth S. D. Norred, Minneapolis.
Wm. F. Nye, Minneapolis.
Justus Ohage, St. Paul.
A. Ortman, Minneapolis.
H. M. Orton, Minneapolis.
Jay Owens, St. Paul.
John Pearson, Duluth.
C. E. Persons, Marshall.
E. Phillips, Minneapolis.
W. B. Pineo, Minneapolis.
Leonard F. Pitkin, Stillwater.
W. H. Pratt, Stillwater.
Harriet E. Preston, St. Paul.
W. H. Powell, Murdock.
F. L. Puffer, Bird Island.
Thomas F. Quimby, Minneapolis.
James A. Quinn, St. Paul.
T. J. Rainey, Minneapolis.
A. C. La Mothe Ramsey, St. Cloud.
S. W. Ransom, Dodge Centre.
Gustav A. Renz, St. Paul.
J. C. Rhodes, Stillwater.
Edson Rhodes, Winona.
Henry N. Rice, Fairmont.
W. Richeson, St. Paul.
C. E. Riggs, St. Paul.
A. F. Ritchie, Duluth.
Park Ritchie, St. Paul.
Alex. Rixa, St. Joseph.
Warren B. Robb, St. Paul.
Thomas S. Roberts, Minneapolis.
Carrie S. Rogers, Minneapolis.
C. E. Rogers, Montevideo.
F. M. Rose, Faribault.
Augusta L. Rosenthal, Winona.
J. C. Rosser, Brainerd.
A. P. Rounsevell, Delano.
A. H. Saulsbury, Minneapolis.
Belle J. Schmeer, St. Paul.
Carl Schulin, St. Paul.
A. E. Senkler, St. Paul.
S. B. Sheardown, Winona.
T. W. Sheardown, Chicago.
F. O. Sherwin, Duluth.
P. Shillock, St. Paul.
A. Shimonek, St. Paul.
J. S. Shrader, Delano.
J. D. Simpson, Henderson.
Charles Simpson, Minneapolis.
C. M. Skinner, Minneapolis.
C. G. Slagle, Minneapolis.
C. E. Smith, St. Paul.
V. Smith, Duluth.
H. Sneve, Albert Lea.
A. E. Spaulding, Luverne.
E. C. Spencer, St. Paul.
C. J. Spratt, Minneapolis.
S. P. Squires, Austin.
Franklin Staples, Winona.
A. H. Steen, Cottage Grove.
D. A. Stewart, Winona.
J. H. Stewart, Jr., St. Paul.
C. A. Stewart, Duluth.
J. Clark Stewart, Minneapolis.
A. W. Stinchfield, Eyota.
S. M. Stocker, Duluth.
E. H. Stockton, Minneapolis.
A. G. Stoddard, Beaver Falls.
C. S. Stoddard, Redwood Falls.
A. J. Stone, St. Paul.
J. J. Stone, Wabasha.
W. M. Stratton, Granite Falls.
Daniel Straw, Wells.
O. C. Strickler, New Ulm.
M. Sullivan, Adrian.
John A. Sweat, Minneapolis.
J. H. Stuart, Minneapolis.
C. H. Tasker, Anoka.
N. S. Tefft, Plainview.
R. C. Teschan, Winona.
Tonnes Thams, Minneapolis.
J. W. Thompson, St. Paul.
C. M. Thompson, Northfield.
W. Thorne, Hastings.
J. M. Todd, Madison.
F. E. Towers, Minneapolis.
W. H. Twiford, Geneva.
J. Q. A. Vale, Homer.
F. W. VanSlyke, St. Paul.
G. Vivian, Alexandria.
W. C. Voight, Stillwater.
C. H. Voorhies, St. Paul.
Kee Wakefield, Hutchinson.
Wm. Wakefield, Lake Benton.
Belle M. Walrath, St. Paul.
H. S. Walrath, St. Paul.
S. S. Wallbank, Duluth.
Anes F. Wass, Minneapolis.
Lizzie R. Wass, Minneapolis.
O. A. Watier, Stillwater.
A. C. Wedge, Albert Lea.
C. L. Wells, Minneapolis.
J. W. B. Wellcome, Sleepy Eye.

S. S. Wentworth, Minneapolis.
Paul West, Little Falls.
A. Wharton, St. Paul.
J. M. Wheat, Leonora.
C. A. Wheaton, St. Paul.
H. M. Wheeler, Grand Forks, Dak.
A. S. Whetstone, Minneapolis.
Mary Snoddy Whetstone, Minneapolis.
N. K. Whittemore, Elk River.
Cornelius Williams, St. Paul.
C. B. Witherle, St. Paul.
H. H. Wilcox, Albert Lea.
G. W. Wood, Faribault.
M. E. Woodling, Minneapolis.
F. R. Woodward, Clairmont.
C. J. Woolway, St. Paul.
S. J. Wooster, Minneapolis.
Arthur Young, Prescott, Wis.

HONORARY MEMBERS.

C. B. Ayers Omaha, Neb.
Wm. Baldwin, St. Paul, Minn.
Louis Bauer, St. Louis, Mo.
E. C. Dudley, Chicago, Ill.
F. W. Epley, New Richmond, Wis.
Christian Fenger, Chicago, Ill.
J. B. Griswold, Grand Rapids Mich.
Otis Hoyt, Hudson, Wis.
W. F. Lewis, Mankato, Minn.
C. Carli, Stillwater, Minn.
J. B. LeBlond, Sioux Falls, D. T.
C. T. Parkes, Chicago, Ill.
J. W. Reed, Lime Springs, Iowa.
John B. Shoemaker, Philadelphia, Penn.
F. R. Smith, St. Paul, Minn.
A. B. Stuart, Santa Rosa, Cal.

DECEASED MEMBERS.

A. E. Ames, Minneapolis.
Francis Atwood, St. Paul.
E. T. Bingham, Medford.
Solomon Blood, Owatonna.
W. H. Byford, Jr.. Minneapolis.
Perry Chance. Delano.
W. W. Clark, Mankato.
F. B. Etheridge, Hastings.
E. N. Fairbanks, Austin.
P. J. Goodhue, St. Paul.
S. D. Grant, Watertown.
H. C. Hand, St. Paul.
A. B. Hawley, Red Wing.
N. B. Hill, Minneapolis.
J. C. Jones, Mankato.
G. M. Lambert, Stillwater.
F. Lawson, Osseo.
G. A. Lamb, Minneapolis.
Daniel Leasure, St. Paul.
S. H. Lindley, Minneapolis.
C. Lord, Shakopee.
P. McKeon, Minneapolis.
H. McMahon, Sauk Rapids.
Winthrop Miller, Minnepolis.
F. W. H. Muller, Henderson.
H. F. Noyes, Stillwater.
B. B. Palmer, Sauk Centre.
Ralph Parkin, Minnesota Lake.
W. K. Perrine, Minneapolis.
J. B. Phillips, St. Paul.
T. R. Potts, St. Paul.
J. K. Reiner, Stillwater.
W. H. H. Richardson, Winona.
W. J. Sloan, U. S. A.
E. H. Smith, St. Paul.
J. S. Sprague, Hastings.
Jacob H. Stewart, St. Paul.
S. P. Stoddard, Lake Crystal.
W. W. Sweeney, Red Wing.
J. E. Tibbetts, Cannon Falls.
J. L. Wakefield, Shakopee.
J. S. Whilldin, St. Paul.
Samuel Willey, St. Paul.
Samuel Thayer, Burlington, Vt.

THE NEXT MEETING OF THE SOCIETY

WILL BE HELD AT

SAINT PAUL,

On the THIRD THURSDAY OF JUNE, 1888.